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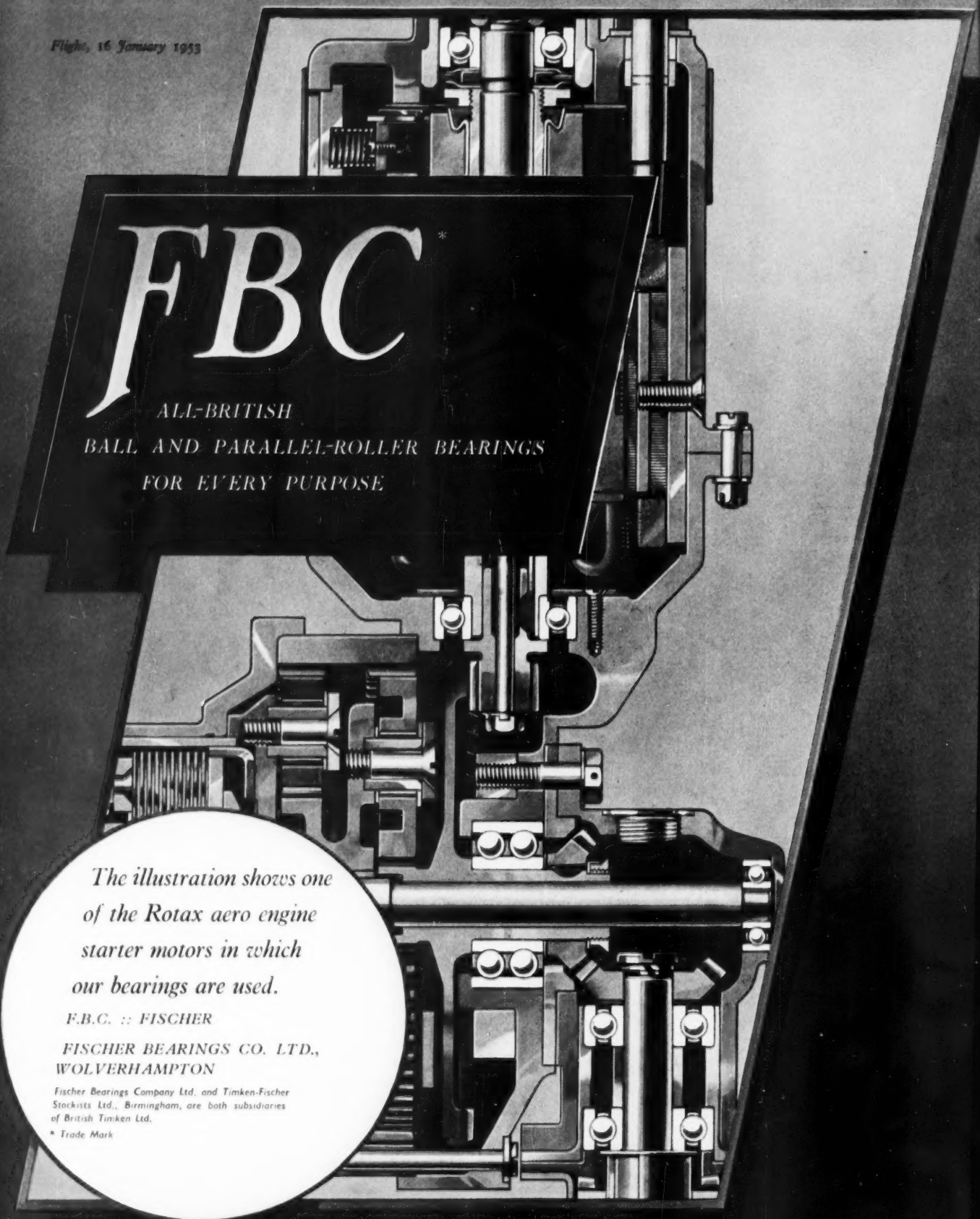

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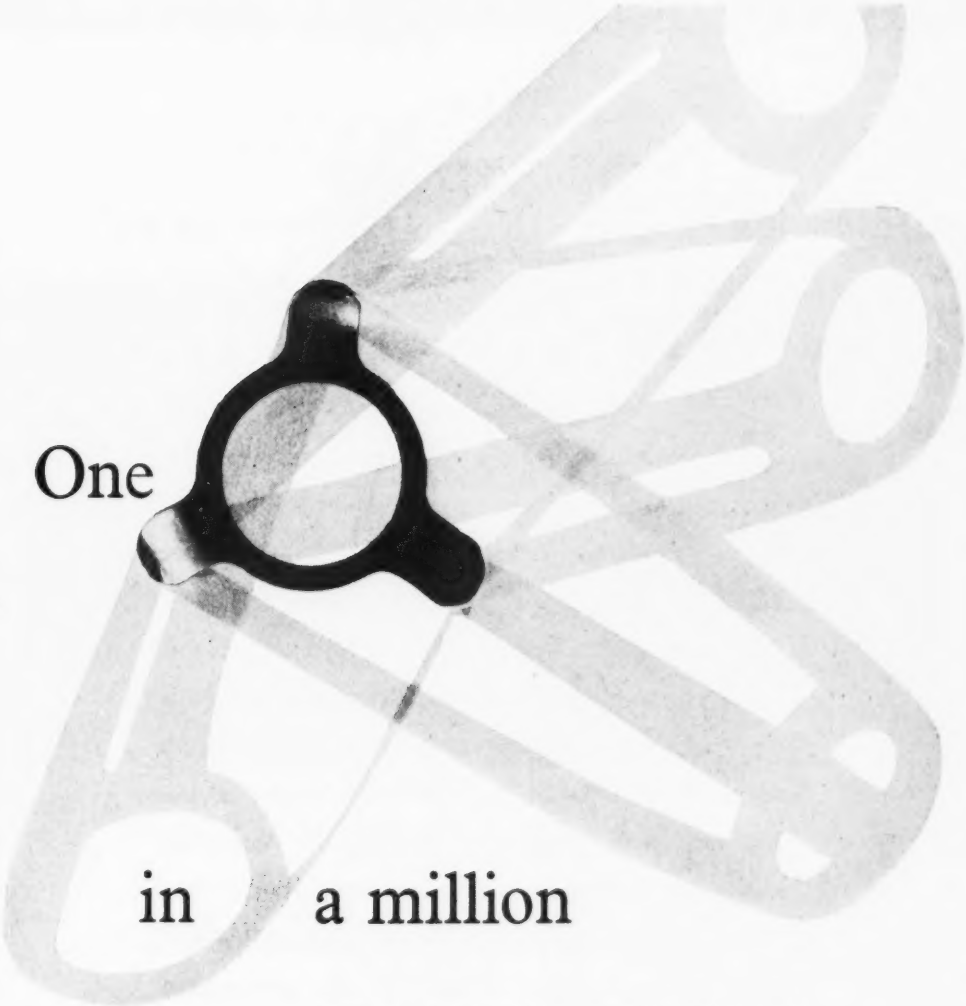

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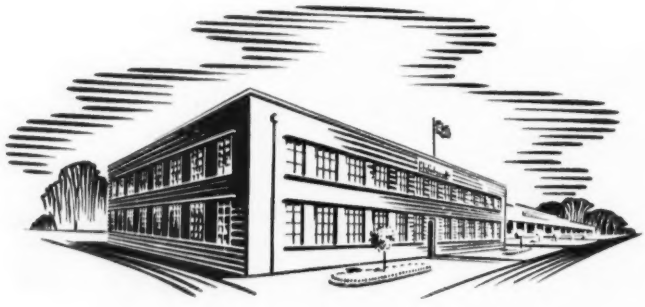

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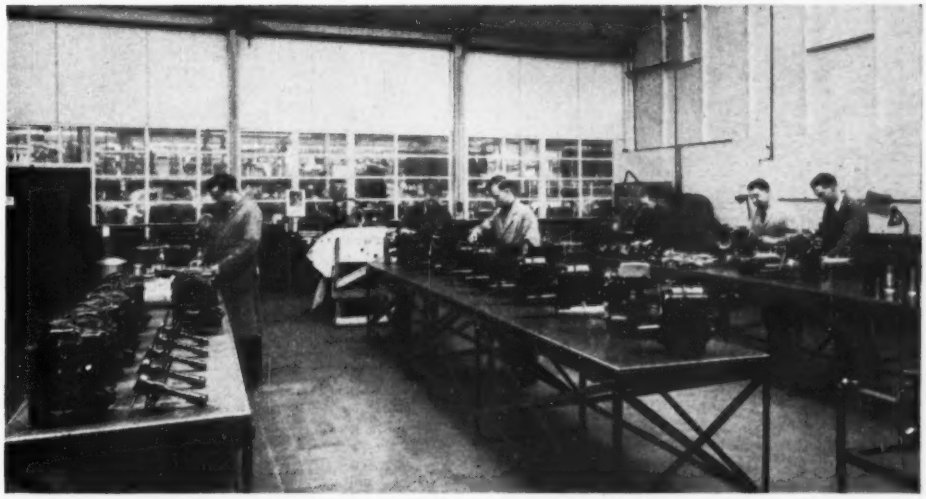

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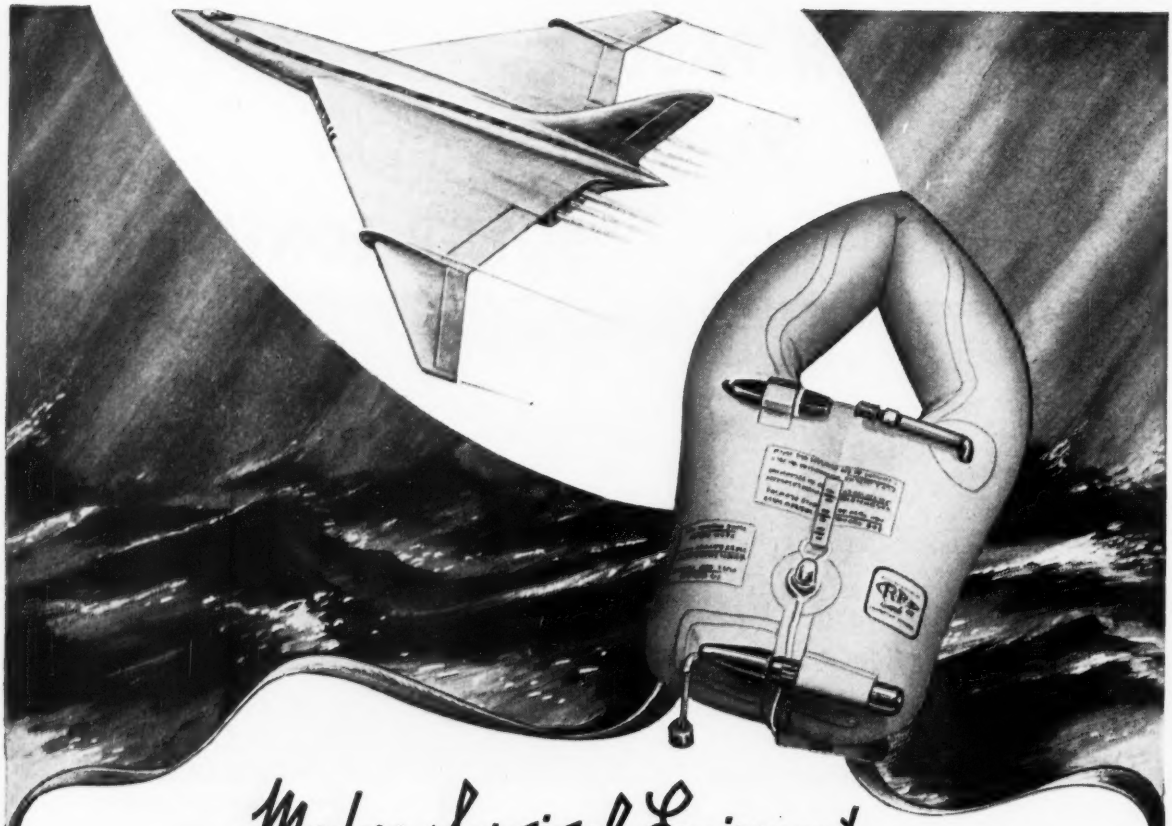

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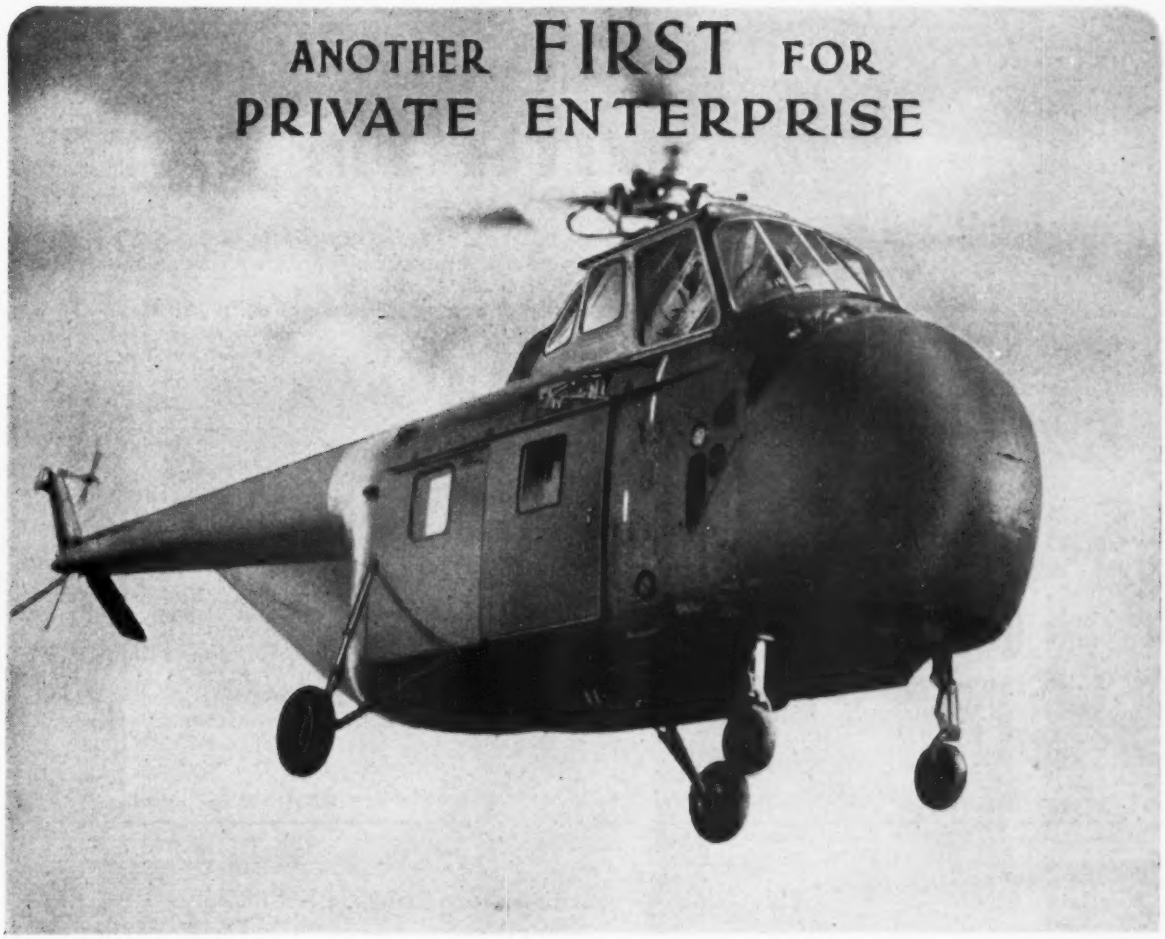

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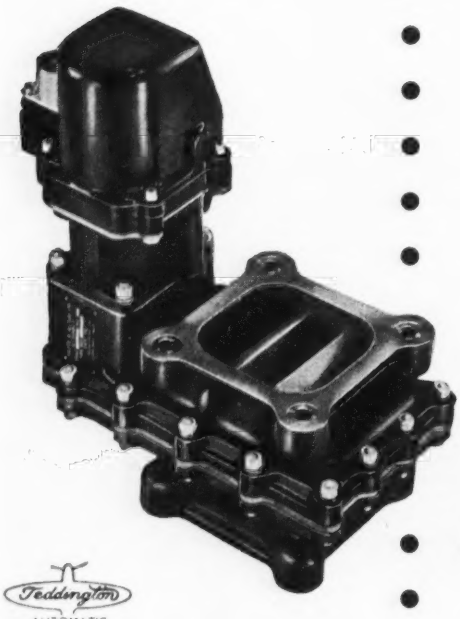

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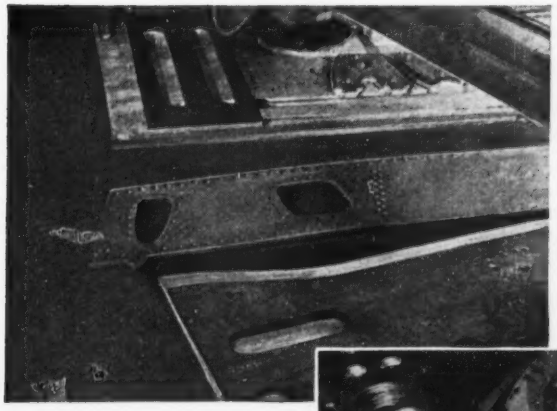

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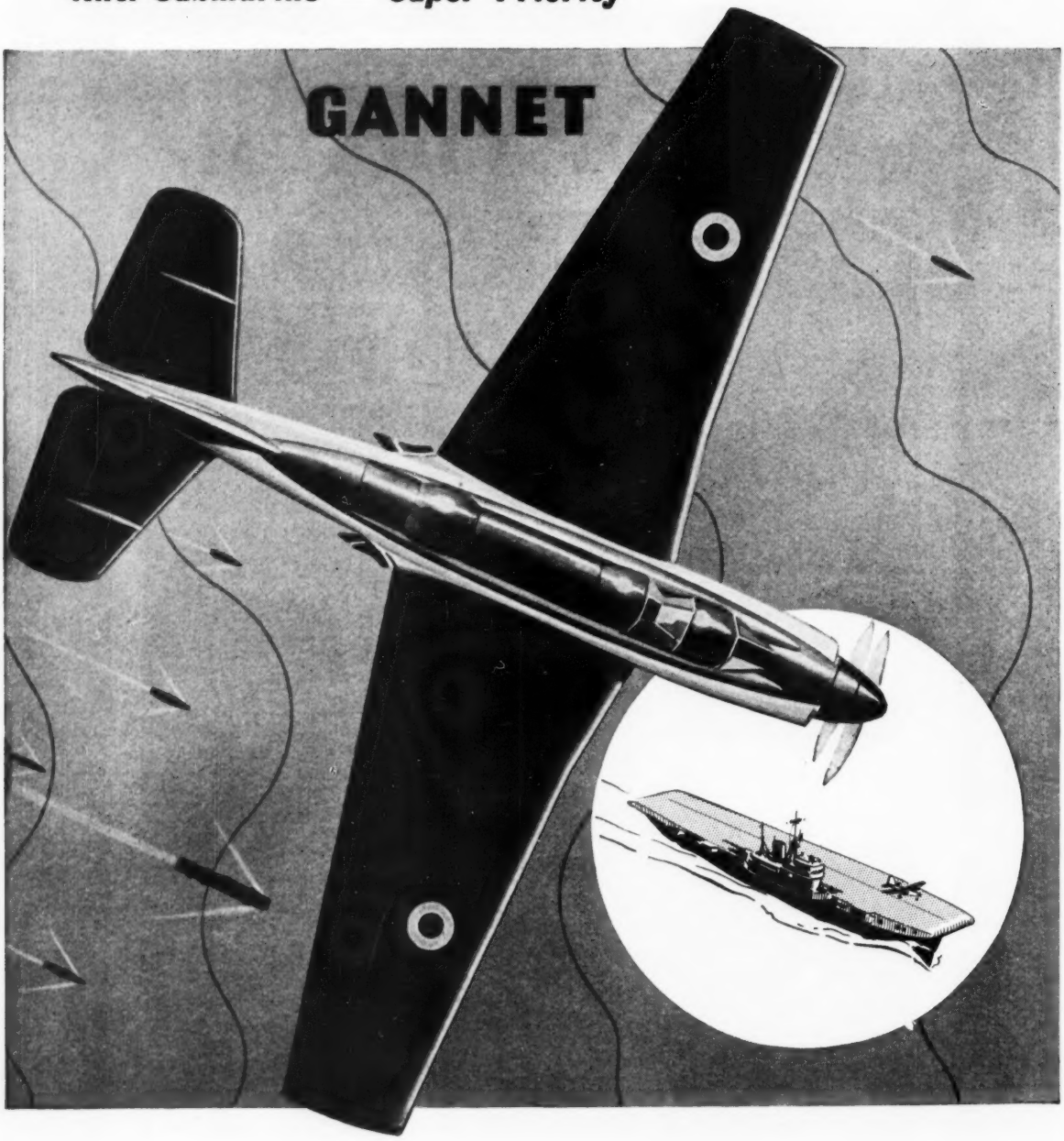

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Out of the Frying-pan . . . ?

THE flying fraternity as a whole has expected great things of the new Government, but in the main they have been disappointed. In our opinion, and in that of many others, the biggest single error of omission has been the failure to create, or even permit to grow up, a feeling of confidence and stability in the aircraft industry, among the independent operators, or among the flying clubs and private owners. Even the Corporations are disturbed by the threat—we hope not a serious one—of amalgamation.

We are without doubt on the threshold of an Elizabethan air age, but it may turn out to be a half-hearted counterpart of the first great Elizabethan age if the individual is to be frustrated and badgered by changes of plans, unco-ordinated scheming, or a variety of petty restrictions.

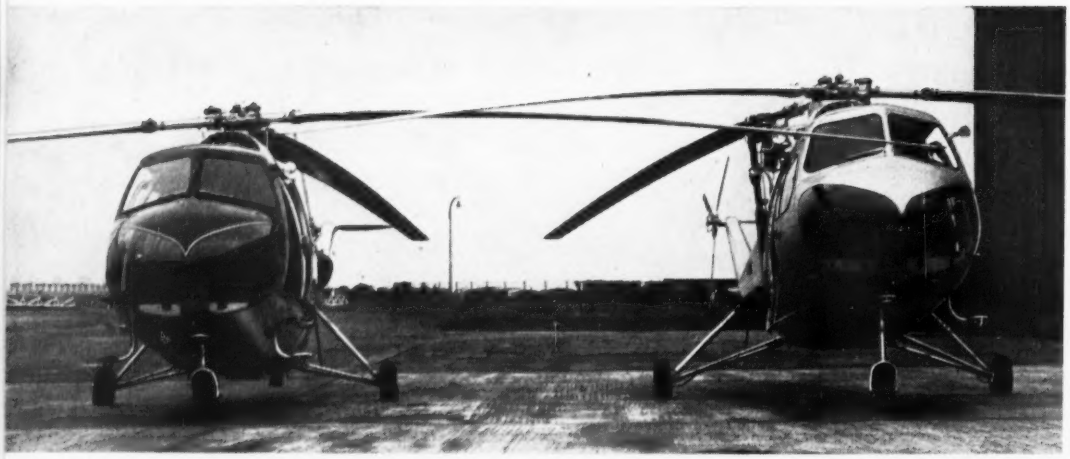
In the House of Commons recently Mr. P. B. Lucas said that in America there was approximately one pilot per 350 head of population, while in this country the figure was nearer one in 6,000. We might add that, in spite of the large numbers of pilots trained during the war years, the British register of private and business aircraft has, by comparison with the pre-war days, diminished by no less than a third—to something under 400. One solitary manufacturer of light civil aircraft remains active. Do these facts indicate the existence of a good foundation of practical air-mindedness from which to face the challenging years ahead of us?

Not long ago we were welcoming a new scheme for the flying of A.T.C. cadets which would at the same time help to ease the cost of private flying. But no sooner was something given than more was taken away. The closing of civil schools and dispersal of 300 trained airmen-instructors is a great blow to civil aviation (though we are not unappreciative of the Air Council point of view). Apart from the material loss, if companies and airfields are to remain in operation either a much larger share of maintenance cost will fall on the clubs and private owners, or facilities will have to be curtailed. All this amounts to a run-down of the private-flying movement at a time when its services are beginning to be most needed.

Now, in the last week or two, the harassed club pilot wanting to fly abroad has learned of a further pin-prick, in the form of what is virtually petrol rationing by cash allowance. There is still time for better and more intelligent counsel to prevail, but as things are at present pilots will receive a sum of only £15 for petrol purchased abroad as from the end of January. This new misery—thought up, we understand, by the Treasury—is near-sighted, ill-conceived, and not a little dangerous in application. Perhaps a curve should be devised to adjust currency allowance in advance according to forecast winds. Surely it would not be right for a pilot Mediterranean-bound to profit from a tailwind springing up between Tyne and Dogger? His allowance should be docked by 10s at least—to be fair to the motorist who is less affected by the wind.

Elsewhere in this issue we refer in greater detail to the closing of schools and to this meddling with a most efficient system for aviation fuel supplies abroad. Regarding the latter, if we are to have to put up with more forms and restrictions, at least let us preserve the thoroughly simple and practical fuel-carnet scheme and place a limit of, say, £50 on the allowance for an aircraft. This sum would at any rate permit a flight of reasonable duration abroad while taking into account the mysteries of aircraft operation —we refer to the fact that even small aircraft use more fuel than a car; that they need more expensive fuel; that landing and hangarage fees are payable abroad (some even approaching the charges levied here by the M.C.A.); that transport from airfield to destination may be required; and that there are such things, internationally recognized, as fuel reserves for bad weather and diversions.

Matters apparently regarded by some people as of minor importance may prove to have a most significant bearing on the future of aviation. For the continued health of the aircraft industry and of British aviation we must have stability and continuity of purpose—no more mid-production cut-backs, no more build-ups followed by redundancy, and no more loudly-heralded encouragement of private flying followed by a removal of the props from beneath its structure. Few things are worse than the devil one doesn't know.



On the ground the stalky undercarriage of the Mk 50 (right) contrasts with that of an earlier Sycamore on the left. Three Mk 50s are due to fly aboard the Australian carrier H.M.A.S. "Vengeance" today.

HELICOPTER DEVELOPMENT AT BRISTOL

A Review of Progress to Date: Types 171 and 173

IT is now some six years since the Bristol Aeroplane Company turned its attention to the field of rotary-wing aircraft, and during this time development has progressed steadily, so that it is now possible to offer a thoroughly proven product. This appears to be an opportune period for the study of what the Bristol helicopter department has accomplished.

The company virtually had to start from scratch in its helicopter work, and a considerable amount of fundamental investigation was initiated, much of which is still continuing. The Type 171 single-engine, single-rotor helicopter was brought to the flying stage in July, 1947. The first two aircraft were powered by a Pratt and Whitney Wasp R-985, mounted with the crankshaft horizontal and driving through bevel gears. These aircraft were extremely useful in proving the initial rotor design and control system, and one machine, VL 963, was actually fitted with an elementary autopilot.

In the Mk 2 aircraft the Alvis Leonides was introduced, and this excellent British radial has since become standard. The first installation—on VW 905—was of the original vertical-crankshaft engine with the accessories on the rear of the crankcase. This proved rather a lengthy engine for convenience of installation, so in the Mk 3 a "shorter" Leonides was incorporated, with accessories mounted on the gearbox just below the rotor hub. Several Mk 3s were built. One was G-ALSX, which completed a tour of Scandinavia and was also used as the aircraft with which the type C. of A. was obtained. Of the Mk 3s ordered by the Ministry of Supply, WT 933 went to Khartoum for tropical trials and WT 939 to Edmonton for Arctic tests. Both these searching examinations were very successful.

The Bristol 171 was given the Service name of Sycamore. The Sycamore H.C.11 is the Army variant currently stationed at Middle Wallop and identified by green-and-brown camouflage. It is reported that this communications version is at present being prepared for service in Kenya. The Mk 10 is an ambulance development carrying two stretchers, one above the other across the fuselage, with their ends faired by a large transparent blister on each side. This type is now to undergo an evaluation under M.o.S. patronage in the jungles of Malaya—where its capabilities may well find very valuable applications.

The Sycamore Mk 12 of Coastal Command has a white finish, and photographs have been released showing its 400-lb hydraulic hoist at work lifting "survivors" from the sea. Among the very comprehensive equipment carried by the Mk 12 are Gee, Rebecca, and a radio altimeter with accurate height-setting switches. The radio is the STR.9X and provision is made for an F.24 camera. The H.R.12 is, in fact, the first helicopter specifically designed for rescue work to be put into service. It has also undertaken experimental anti-submarine work.

A civil transport Sycamore is the Mk 3a, two of which are on order for British European Airways. This corporation at one time operated an early 171 (G-ALSR) and appears well pleased with the results. The 3a will have an extended fuselage to provide increased luggage capacity; its initial duty will be on B.E.A. internal freight-services, but fare-paying passengers are likely to use the type later.

The final Sycamore of which details may be published is the Mk 50. Illustrated on this page, it is seen to sit considerably higher from the ground than its forbears. This fact arises from the new undercarriage geometry; the main legs are longer by nearly a foot and the nose leg has been lengthened by an even greater amount. As a result, the aircraft has a ground clearance of some 15in—against 5in—and the ground angle has been increased. Ground clearance was further improved by moving the exhaust from the belly to the starboard side—a modification which may also be beneficial in removing the possibility of causing grass fires.

The Mk 50 is destined for service aboard H.M.A.S. *Vengeance*, a light fleet carrier now transferred to the Australian Navy. Two R.A.N. pilots have come to collect three of these aircraft, and they were due to fly aboard *Vengeance* today, January 16th. They are to proceed to Australian

Although not dissimilar structurally from earlier Sycamores, the Mk 50 presents an entirely different face to the world; in this view it appears quite insect-like.

waters, where they will be put to a possibly severe routine of photography and air-sea rescue. A Sycamore is to be on hand, with Leonides running, at every fly-off of aircraft, and also during landing-on. Rescue of ditched personnel is now usually accomplished by two destroyers—on the face of things, the Sycamore appears a more economical proposition.

By virtue of the new landing gear, this Sycamore has much-improved ground-stability, and the rotor clearance is naturally somewhat greater than previously. Furthermore, the increased ground-incidence makes it possible to fly-off the Mk 50 with the stick central, instead of aft—a feature which has earned universal approbation, and reports have it that Boscombe Down consider this the best of all the light rotary-wing aircraft from the handling viewpoint.

The type has hydraulic, self-priming brakes (which do not require an engine-driven pump); five seats; and a fully sprung panel carrying all the cockpit instruments. The first aircraft carries the British serial XA 221, and the all-up-weight is now at 5,400 lb.

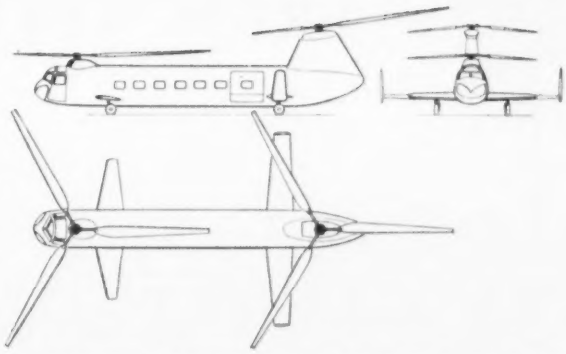
As a result of the company's diverse experience in the operation of helicopters under so many types of conditions for a variety of purposes, a form of "universal Sycamore" is under development. This should be a most useful vehicle, for it will not only embody all the lessons of the Sycamore's development, but provision will be made for the incorporation of any desired feature in the basic airframe—winch, stretchers, cameras and like equipment—without any structural alteration. This general-purpose variant, which appears worthy of big production, will seat the pilot on the right. America has adopted this layout, which appears to be generally approved; it enables the pilot to fly with his right hand, with a central collective-pitch lever.

Twin-engined Variants

Turning to the Bristol 173, which represents so notable a contribution to helicopter engineering and operation, it may be recalled that the first prototype of this twin-engine, twin-rotor aircraft originally experienced some trouble in the matter of ground resonance. This was cured by linking the left- and right-hand oleo legs of the undercarriage by small-bore hydraulic piping, which was carried round from the tops of the legs in prominent external arcs.

The 173 Mk 2, G-AMJI, is fitted with a cleaned-up hydraulic linkage, the piping now being internal. Some lateral damping is afforded by hydraulic resistance within the thin linking-pipes, but strong tension springs are now located beside each leg both to provide damping and decrease fuselage-torsion on the ground. The latter has now been reduced to a fraction of its original value. The Mk 2 aircraft, which is now in the final assembly stage, is unique in having non-castoring rear wheels and car-type front wheels complete with king-pins and track rods. These front wheels are not steerable, but are castoring and centred by springs. (In the first 173, all wheels were fully castoring.)

Another development seen in the second 173 is the incorporation of a very large main door capable of passing bulky loads and stretchers; it divides and folds along hinges at top and bottom, the top forming a large canopy and the lower section a very neat step. The two parts are interlinked and are approximately balanced; a somewhat similar arrangement is used in the B.E.A. Elizabethan.



Two sets of wings help to carry the weight of the Bristol 173 Mk 3. Two Alvis Leonides Majors will provide the power for the later versions.

Further development at Bristol is, of course, known to include the 173 Mk 3 and the 181. The former is a "stretched" development for some 18 passengers, and it is shown in the small G.A. drawing on this page. Two sets of stub wings are fitted; these help to unload the rotors at speed, the resulting reduction in angle of blade incidence permitting considerably increased flight-speeds. The Leonides Major is scheduled as the power-plant, and it will be a happy arrangement if both the airframe and engine can be developed concurrently. There would appear to be a very considerable future for a machine of this type, with its generous load-carrying capability and good cruising speed.

Looking even farther ahead, it may be recalled that British European Airways formulated a specification for a "Bealine Bus" helicopter, with a seating capacity for about 45, which the Corporation consider to be the optimum target at which builders of commercial helicopters should aim. The 181 is known to be a larger aircraft than the 173, and Bristols have been at work on this project for some months. It would indeed be strange if they did not make a bold attempt to capture some, if not all, of the great market open to a "Bealine Bus" builder.

The present position is one in which fully developed aircraft are available for sale for a number of purposes. On the other hand, many potential operators are not inclined to buy until they are sure of what lies "just around the corner," and yet few can pay development costs. No helicopter builder can work off development costs on civil production, and it may be that more rapid military ordering is the real solution. Orders are the key to prosperity in helicopter development, as in all other things; it is in the national interest to ensure that development of new projects is not retarded by the lack of bold decisions on the part of future purchasers.

CAUSES OF CONTRAILS

A DETAILED study of the formation of condensation trails behind aircraft is given in the second edition of a Meteorological Office pamphlet* on the subject.

Trails are formed when water vapour is condensed into droplets of water (i.e., cloud) after the passage of an aircraft. There are several causes of condensation in such circumstances, but by far the commonest is that petrol or kerosine, when burnt in an engine, produce water vapour. Further, the colder a mass of air, the less water vapour it can contain; consequently, if the excess moisture produced by the engine more than offsets the heat generated at the same time, condensation is liable to take place. In the British Isles, this normally occurs only within an altitude-band ranging from about 21,000ft (winter) or 28,000ft (summer) to a few thousand feet into the stratosphere. The "immunity temperature" is that above which trails will not form even in an already-saturated atmosphere, and it can now be predicted with reasonable accuracy. This temperature therefore prescribes the lower limit of the altitude-band: the upper limit, in the stratosphere, has its origin in the fact that the atmosphere there grows drier, but not colder, with increasing altitude. The trails may be of short duration, or long and persistent: the latter type are frequently, but not always, associated with cirrus or cirro-stratus cloud.

In direct contrast to those caused by addition of water to the atmosphere, trails may also be formed behind airscrews or wing-tips by the pressure-reduction that occurs in these locations. If pressure is reduced, expansion of air follows, causing a drop in temperature. If this drop is sufficient, a "cloud trail" may form. Other, less familiar, causes of condensation are the mixing of layers of air by airscrew or jet efflux, the effects of electrically charged particles, and the ability of exhaust-supplied particles to act as nuclei of condensation.

The subject is clearly of more than academic interest, as the position of an aircraft is immediately given away if it sails through the air with a dense white plume streaming away behind it.

**M.O. 479: "Condensation Trails from Aircraft." Her Majesty's Stationery Office, York House, Kingsway, London, W.C.2 (or from booksellers Price 9d.*

FROM ALL QUARTERS

The "Offshore" Swifts

THE U.S. offshore-purchases scheme involves the placing of orders by America with firms in the various NATO countries: these firms then supply the products to the armed forces of other NATO countries, and the cost is paid in dollars by the United States. Congress, however, has laid down that all such contracts must be completed before June 1955, and this date-line has caused great uncertainty in regard to the placing of a production order for the Vickers-Supermarine Swift.

Tests were carried out by the Americans on the aircraft last year, and were in general very favourable—though both British and American experts realized that certain modifications would be required. A further advantage was that production of the aircraft before June 1955, on a scale sufficient both for the R.A.F. and for certain NATO countries, appeared to be possible. Now there seems to be some doubt as to whether the necessary modifications can be made in time to permit such production before that deadline. Furthermore, the most recent evaluation of the Swift and the Hawker Hunter by General A. L. Boyd (senior test pilot of the U.S. Air Force), which took place late last year, presented an unusually complimentary picture of the latter aircraft.

Official opinion, which once took the line that adequate modification of the Hunter for pre-June 1955 NATO delivery was too optimistic, now appears to have undergone a major about-face, and it seems possible that an off-shore contract for the Hunter might follow upon an offer by the British Government to make the aircraft available for this purpose.

It is certainly to be hoped that some contract will be placed in the very near future. It may be that the evaluation trials already carried out show up the Hunter in an even more favourable light than the Swift, in spite of the latter's longer range—but, clearly, if no order is placed the old, old situation will arise of no aircraft at all being available. The effect of a similar lack-of-policy in the days before the Battle of Britain can well be imagined. If all Hurricane production had been stopped in favour of Spitfires, and the Spitfires had not yet arrived in squadron service when the alarm sounded. . . .

In conclusion, it may be stated that $225m. is earmarked for offshore aircraft contracts in the fiscal year 1952-53, but that unless a very rapid decision is made, or Congress alters the June 1955-deadline, little production of British fighter aircraft is likely to materialize under the scheme.

The Air Ministry, referring to the position, has said that no change of any kind is envisaged in the production of either Swifts of Hunters for the R.A.F.; the former were due to enter squadron service in June. In any event, the extensive sub-contracting arrangements which have now been made for the Swift will not be unduly affected, as interest in other quarters overseas appears to be considerable.

R.Ae.C. Design Competition

THE light aircraft design competition sponsored by the Royal Aero Club, which closed for judging on December 31st last, attracted a total of nineteen final entries.

Col. Preston has been good enough to let us have a preview of the entries. The standard of presentation is very high, and —as was to be expected—the majority of the designs appear to have been developed on drawing boards within the industry. Even so, each competitor has been required to carry out calculations of a type normally reserved for a specialized department, namely, assessment of overall cost.

Costing, in fact, appears to have given the most trouble and produced the widest range of answers. But on the score of performance all the entries fall into quite narrow bands—about 110-125 m.p.h. cruising speed for the two-seat tourers and around 330 m.p.h. for the Turboméca-powered racers.

The majority of the designs are fairly conventional, and no particular difficulty should attach to production of any of them. Almost the only points which may be mentioned at this stage are a tendency for the adoption of a nosewheel undercarriage and a butterfly tail. The average size of the aircraft appears rather small by contemporary standards, notwithstanding the weight clause in the entry specifications. As a result, some very good little airframes have been designed around the de-rated Blackburn Cirrus Minor, and some delightful racers—more than one of Volksjäger configuration—using the Turboméca Palas.

It is greatly to be hoped that the winning designs will be rewarded by the prospect of eventual production. The judging is being undertaken—in their own time—by Messrs R. E. Hardingham and W. Tye, and a team from the Air Registration Board. The results are not expected to be announced for at least a month; having seen the entries we find this fact by no means surprising.

S-55s in Malaya

LARGE helicopters, in service with the American forces, have proved outstandingly successful in Korea, both as troop carriers and as casualty-evacuation ambulances. In the British operations in Malaya, freight of all kinds has been parachuted to outlying troops, but hitherto no method of transporting troops in substantial numbers has been available, so that infantry have had to make long and arduous marches before they could hope to contact the enemy.

General Sir Gerald Templer, on his arrival in Malaya, was impressed with the possibility of using larger helicopters than the available S-51 Dragonflies, and now the first squadron of S-55s has arrived in Singapore. This unit, No. 848 Squadron, is commanded by Lt. Cdr. F. H. Suthers, R.N., and the ten aircraft with their flying and maintenance crews arrived on January 8th in the aircraft-carrier *Perseus*. One machine, piloted by Lt. R. Taylor, R.N., suffered an engine failure whilst being flown ashore, and appears to have made an autorotative descent in a sloping jungle clearing. The crew of three were unhurt. An engineer was lowered by hydraulic hoist from another aircraft to inspect the damage preparatory to salvage operations.

Hawker Siddeley Appointment

A NEW appointment to the board of the Hawker Siddeley Group, Ltd., is that of Mr. J. F. Robertson, C.A., a well-known member of the organization who is an expert on aviation finance and taxation. As a member of a firm of accountants, Peat, Marwick and Mitchell, his first connection with Hawkers came when he audited the company's books at Kingston in 1930. Eight years later he joined the company as treasurer, and ever since that time he has been responsible for supervizing much of their financial policy and organization.

Mr. J. F. Robertson.

Commenting on the appointment, Sir Frank Spriggs, K.B.E., F.R.Ae.S., Hawker Siddeley chairman and managing director, said : "Once again the board has gone down into the organization to bring up a director who knows the aircraft industry inside and out. When Mr. Robertson joined our group he came to us already 'knowing most of the answers' since he had spent 15 years with Peat's, who were auditors to several of our operating companies."

Mr. Robertson is chairman of the taxation committee of the S.B.A.C., and the representative of the aircraft industry on the corresponding committee of the F.B.I. He is also a director of the Armstrong Siddeley Development Co., Aluminium Wire and Cable Co., Ltd., and Self-Changing Gear Co., Ltd.

Sir Robert George's New Post

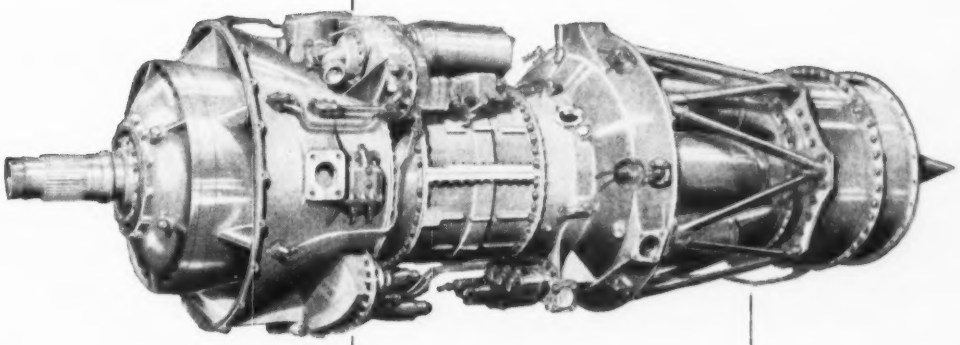
LAST Wednesday A.V-M. Sir Robert George, who recently retired from the post of British Air Attaché in Paris, was due to sail for Southern Australia, where he is taking up his appointment as Governor. His wife is accompanying him, and they will be followed later by their daughter. Two sons in the R.A.F., and one still at Sedbergh, remain behind.

NATO Air Power Lacking

SPEAKING at Fontainebleau on December 7th, General Norstad, American Commander-in-Chief, Allied Air Forces, Central Europe, said that air power available at the present time was "far short of the military requirements." The General went on: "I believe, however, that the forces we now have in process of organization and equipment represent a significant factor in the overall balance. We are reaching about this time a level where in the sad event of war we could take a toll and exact a price. We cannot, of course, achieve our full military mission by any means. But I think we have become at least a small deterrent factor."

In the view of some observers, a dangerous period lies immediately ahead. They claim that the increase of allied air and surface forces to an appreciable size, coupled with recent statements from Mr. Churchill, Mr. Eden and others that the danger of war has to some degree receded, may give rise to a sense of complacency amongst NATO countries unless steps are taken to counteract such a tendency.

Airfield-building is reported to be proceeding apace, 90 out of



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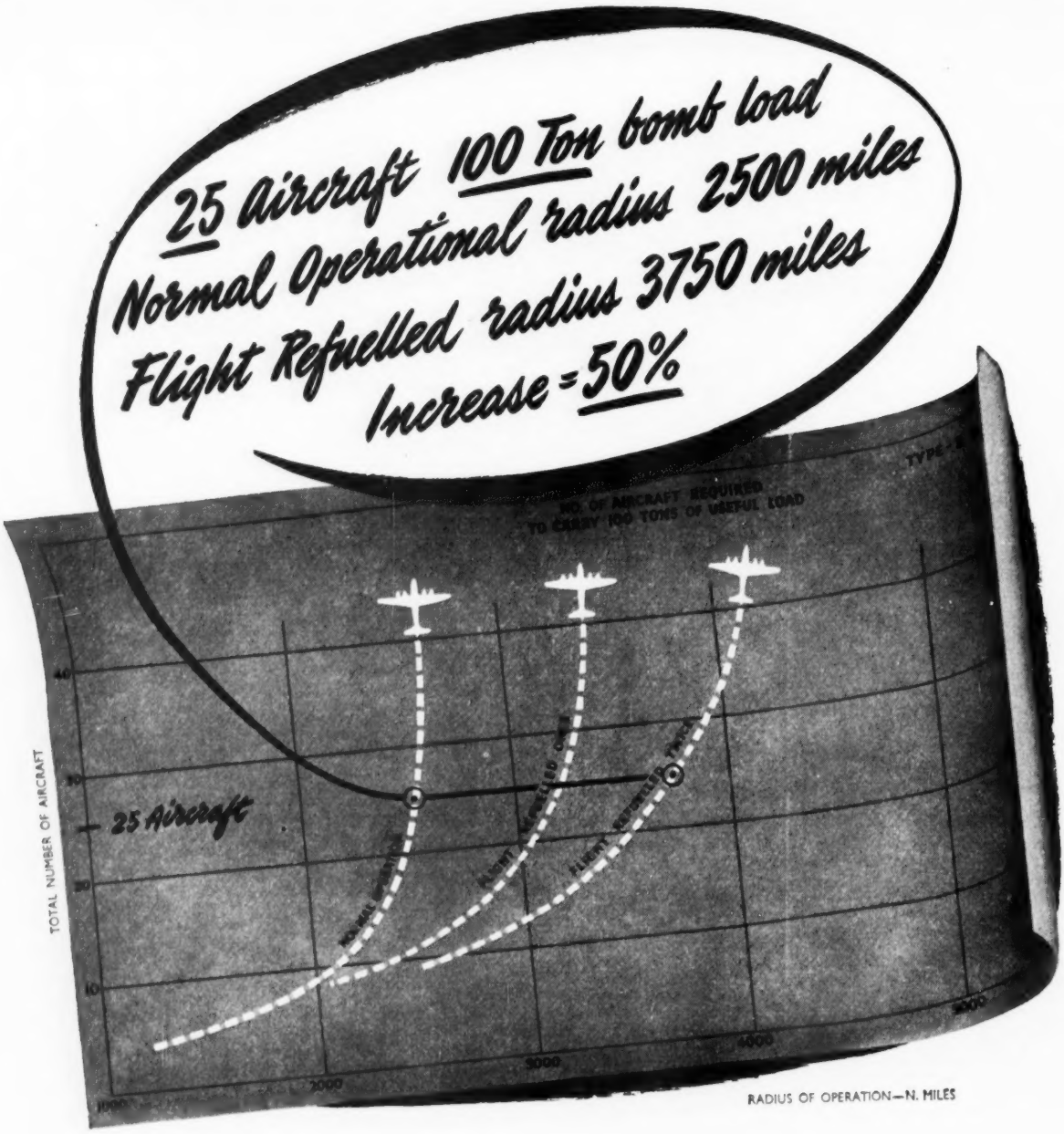

The practical, *immediate* potentialities of refuelling in flight have been demonstrated by the rapid refuelling of military jet aircraft while flying at high speed. Today, highly developed far beyond the experimental stage, flight refuelling is a simple, economical method of substantially improving the range and useful load of both military and civil aircraft. As an example, one of the vitally important aspects of this question—radius of operation — is indicated in the above graph. The advantages of flight refuelling, together with their bearing on present conceptions of effective air power, are strikingly apparent.

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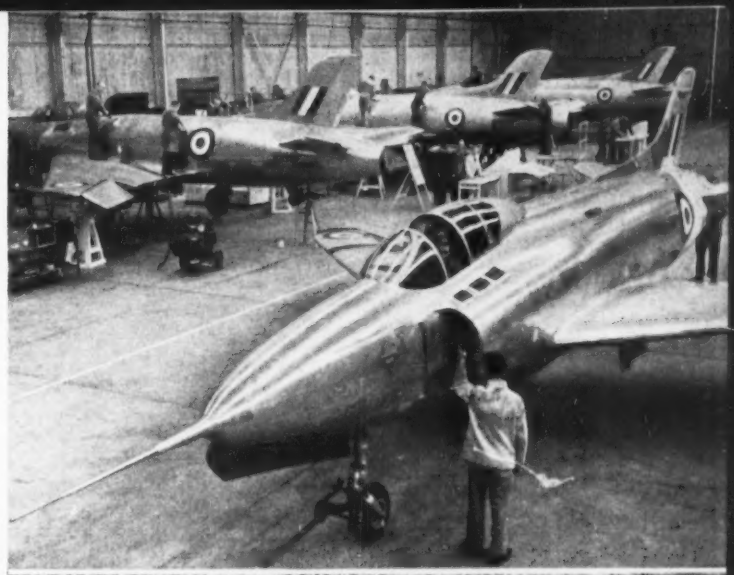


LENGTHENING LINE—1: The encouraging groups of Vickers-Supermarine fighters in the two upper pictures were recently photographed in the hangar at Chilbolton. In the top view the foreground is occupied by second prototype Swift, WJ-965, which has been tufted at the rear end of the fuselage, and has new small fairings on the fin. On the left is the prototype 535, VV-119, on which the shorter air-intakes and dorsal fin are retained. The line-up in the middle picture includes first and second production Swifts, WK-194 and 195, and the first and second prototypes, WJ-960 and 965. The most distant aircraft is either incomplete or exhibits minor differences around the rudder and dorsal areas.

FROM ALL QUARTERS . . .

the 126 at present planned being either complete or under construction—but in the case of some of those on the Continent it is said that not all will be capable of standing up to the wear and tear of modern military-aircraft operations.

While the maxim "quality rather than quantity" is particularly applicable to this country—especially to aircraft construction—to carry such an attitude to an extreme would be dangerous, for quality alone patently cannot make up for deficiencies in numbers.

U.S.A.F. Accidents

THE disturbing total of 288 lives was lost in accidents involving American military aircraft during November and December. Great concern is felt in Washington at these figures, and Mr. Finletter, Secretary for Air, said last week that "nothing less than the complete absence of accidents" would be regarded as satisfactory.

Both Mr. Finletter and Gen. Hoyt S. Vandenberg (Air Force Chief of Staff) produced statistics showing that major accidents had, during 1952, dropped to an all-time low of 29 per 100,000 flying hours: this was calculated on a total of 8,000,000 flying hours during the first 11 months of the year.

If our slide-rule does not lie, this works out at approximately one accident in every 3,450 hours, and makes a total of 2,320 for the 11 months. The figures showed pilot-error to be responsible for 51.3 per cent of the crashes, equipment failure for 27.4 per cent, and maintenance trouble for 6.5 per cent: the remaining 14.8 per cent were unaccounted for. No evidence of sabotage, it was stated, had ever been discovered. The statistics included events in Korea that were unconnected with enemy action.

Commenting on the number of accidents, Mr. Finletter said that the present "desperate race for air supremacy" necessitated putting into the sky "hot planes with a larger danger content—a risk we have to take in this business."

General Vandenberg, in an accompanying statement, pointed out that over 20 new types of aircraft had been introduced into the Service during the preceding five years, and with these it had become commonplace for crews to fly in all kinds of weather at altitudes and speeds unknown to commercial aviation.

The House Armed Services Committee had called for these statements as a preliminary to deciding whether to hold a full-scale investigation.

Sir Vernon Brown's New Post

THE impending retirement—at his own request—of A. Cdre. Sir Vernon Brown, Chief Inspector of Accidents, Ministry of Civil Aviation, was announced in November, as was the appointment of Mr. P. G. Tweedie, the Deputy Chief Inspector, as his successor. Last week, on January 6th, an informal party was held at Ariel House, London, in honour of Sir Vernon. His many friends and acquaintances in the aircraft industry will be glad to learn that he will continue his association with aviation, for he has been appointed technical adviser to the Graviner Manufacturing Co., Ltd., specialists in fire-suppression and fire-fighting equipment. He told us on the occasion of the party that one of his special interests would be explosion suppression, both for aviation and industrial applications.

Death of Rolls-Royce Pioneer

THE death of Mr. John De Looze, a pioneer executive of Rolls-Royce, Ltd., took place in a Derby hospital on January 6th, at the age of 80. Mr. De Looze joined the then Mr. Royce as cashier in 1893, when the firm was gradually changing over from crane and electrical manufacture to that of cars. He was one of the very few who strongly believed in the future of the motor car, and he was promoted to secretary when the business became a limited liability company. This position he held until his retirement in 1943, playing an important rôle in establishing finance on a sound basis, and being closely concerned with most of the major expansions that took place.

LENGTHENING LINE.—2: At Weybridge, three B.E.A. Viscounts, near completion, while beyond them can be seen several more fuselages.

HERE AND THERE

POINT OF NO RETURN: a North American FJ-2 of the U.S. Navy at the crucial moment of being catapulted from the deck of the U.S.S. "Coral Sea." Note the catapult bridle falling away just after disengagement. The FJ-2 is basically a navalized F-86E, and likewise possesses powered, irreversible controls with built-in "feel"; it is armed with four 20 mm guns.

New Arabian Heights

DESPITE criticism from Israel's Ambassador to the United States, Mr. Abba Eban, British plans to sell jet fighters to Arab countries are not likely to be opposed by America. Informal consultation had already taken place between Britain and the United States, and the American official view was that the proposed sale was not likely to lead to a Middle East armament race.

Royal Aero Club A.G.M.

THE Annual General Meeting of the Royal Aero Club will be held at 119, Piccadilly, London, W.1, on Wednesday, March 25th, at 6 p.m. Election of members to the committee and house committee will be on the agenda.

Australian Firsts

THE Australian Defence Production Minister, Mr. Eric Harrison, has announced that the first Australian-built Canberra is expected to fly next month. The first Sabre built there will also be ready for flight-testing; both aircraft will be pre-production models. The Australian-built Avon engines that power the Canberras will be ready for testing in March, and those for the Sabres "some months later."

Canberras in N.Z. Race

ENTRY fees for two Canberras of the Royal Australian Air Force have been received at Canterbury, New Zealand, by the International England-N.Z. Air Race Council; the aircraft are entered for the speed section of the race. A further entry has been received from two Reserve officers of the R.A.A.F., S/L. A. J. R. Oates and F/Lt. D. Swan, who will compete in a Mosquito. It is hoped by the sponsors that one of the two Comets to be delivered to the R.C.A.F. during 1953 may also be entered. A complete list of competitors will be announced by the Royal Aero Club in London shortly after entries close on January 31st.

ABOUT HELICOPTERS

NEXT WEEK—on Friday, January 23rd—the special Helicopter Number of *Flight* will be published. It will contain articles—some by specialist contributors—on past, present and future aspects of helicopter design and operation, and there will be a number of special illustrations.

Headquarters Move

TRANSFER of the H.Q. of the 12th U.S. Air Force from Wiesbaden to a new base at Landstuhl, west of the Rhine, will begin early in March and be complete in June. The move has been necessitated by the proximity of American Fighter strength to Communist Czechoslovakia. Headquarters of United States Air Forces in Europe will remain in Wiesbaden, since no base further west with suitable accommodation for families of H.Q. staff has yet been found. Col. C. F. Marston, in making the announcements, said that transfer of operational units of the 12th Air Force was already proceeding well. Although the main bases and supply centres were being moved back, those being vacated would not be abandoned, but would be maintained as forward airfields.

HOLDING-OFF: Mr. T. W. Brooke-Smith (Short Brothers' chief test pilot), celebrating the first flight of the Short S.B.5 in company with friends at Belfast, handles a rather different kind of control column; it is to be hoped that the response was equally positive . . .

A.T.A. Reunion

THE annual reunion dinner of the Air Transport Auxiliary Association is to be held at the Clarendon Restaurant, Hammersmith, London, W.6, on Friday, February 27th. Details are obtainable from the hon. secretary, Miss Sidonie Bowell, 25, Luton Road, Luton, Beds.

Dept. of Useless Information

REPORTING on the personal dimensions of their "corps of 800 stewardesses," an American airline announced recently that "compared with skygirls a decade ago, this year's group averages 5ft 4½in in height as opposed to 5ft 3½in, bust 34in, as against 33in, waist 24in, against 24½in, hips remaining at 35in. Percentage of brunettes has increased from 60 to 70, the remainder mostly blondes . . . Figures courtesy of —— Air Lines."

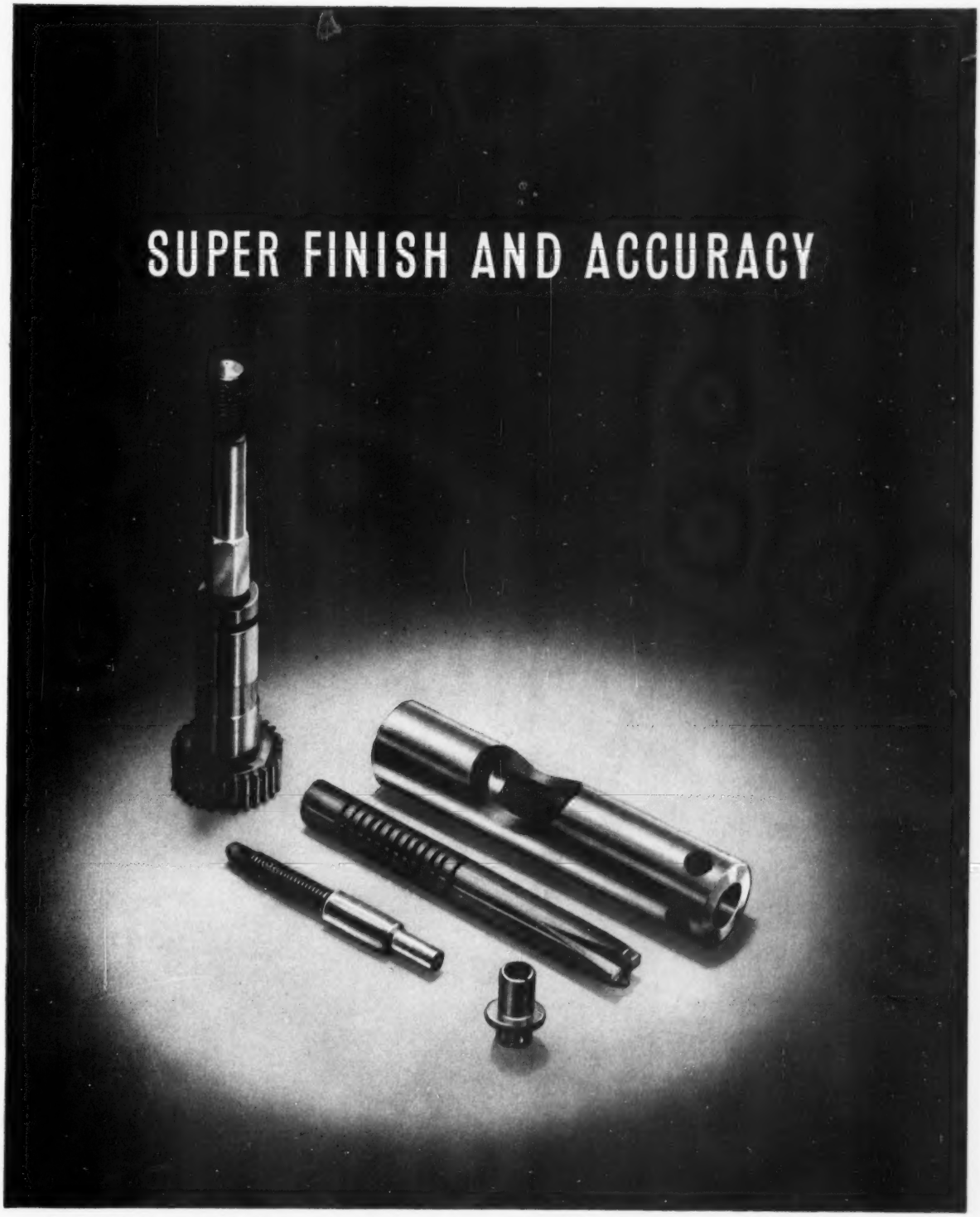
New Ferry Fares

GREATLY reduced summer fares, effective from April 1st, on the Lympne to Le Touquet and Southampton to Cherbourg cross-Channel ferries were announced by Silver City Airways on Tuesday. Examples of the new rates are these single fares on the Lympne ferry (1952 figures in parentheses): Cars up to 12ft 6in long, £7 10s (£16); cars between 14ft 6in and 15ft 6in long, £15 (£20); 250 c.c. motorcycles, £1 15s (£4); pedal cycles, 5s (£1). It is hoped to publish further details next week.

To Study the Works

AN advance party of six officers and N.C.O.s of the Brazilian Air Force, under the command of Major Eduardo Motta, one of their most experienced pilots, reached Derby this week for a fortnight's course on the Rolls-Royce Derwent. Later they will go on to the Gloster works for two months. Further arrivals will eventually make up the party to about ten pilots and 30 engineers, and some of the latter may remain in this country for as long as six months. Brazil recently ordered 70 Meteors, to be paid for in cotton, and the personnel participating in this course will form the nucleus of the two squadrons scheduled for formation.

SUPER FINISH AND ACCURACY



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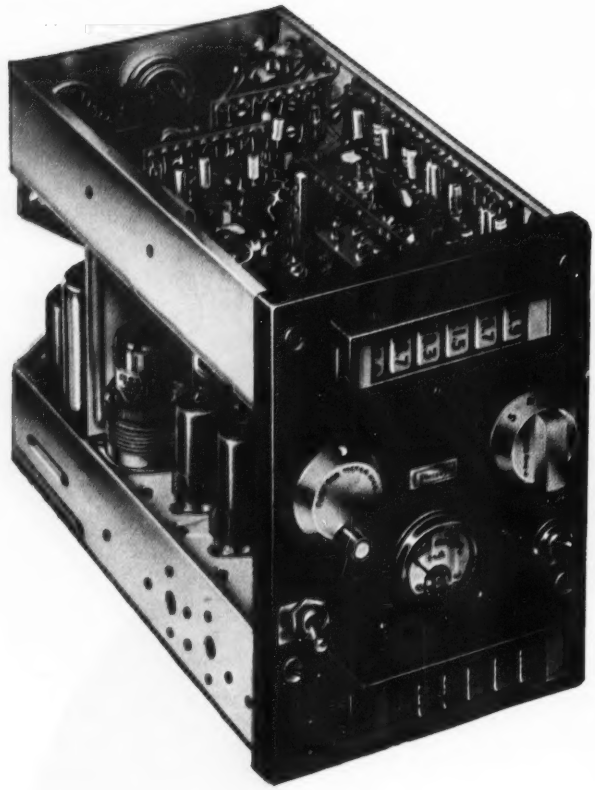

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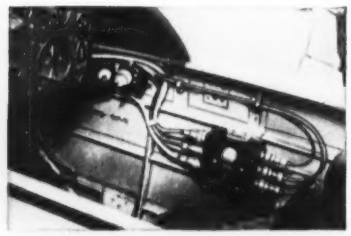
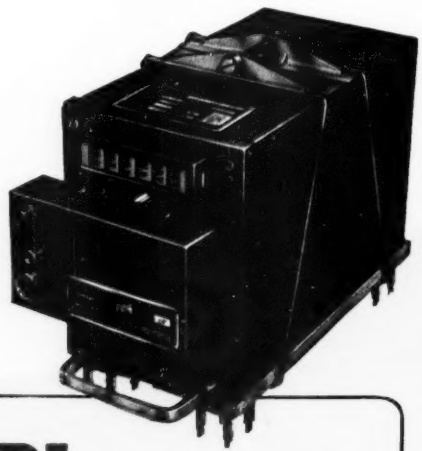
Type PTR 61

The PTR 61 provides VHF R/T communication on six crystal-controlled channels in the 116-132 Mc/s band. The expected range of 50 miles at 3,000 ft. is often exceeded in practice. Three alternative forms of control — simultaneously tuning receiver and transmitter — can be provided at remote or local positions.

- *Power consumption approximately 55 W.*
- *All-up weight including cables 17 lb. (24 lb. with remote control).*
- *Crystals and channel frequencies can be changed in flight.*
- *Intercommunication facilities at up to three positions.*
- *Fully tropicalised.*



Part of dual installation for instructor and pupil on D. H. "Chipmunk."



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AIRCRAFT INTELLIGENCE

GETTING WEAVING: Woven, stripped bamboo and local wood are the constructional materials in this new light aircraft, recently flown by Henry Meider (seen on left) in Manila, Philippine Islands. Tests are being conducted to determine whether these can be substituted for expensive imported materials. The machine is a joint project of the Philippine Air Force and the Institute of Science and Technology.

Great Britain

English Electric Fighter. According to *Aviation Week*, the Short S.B./5 variable-sweep aircraft is "the harbinger of a British fighter type that probably will be built by English Electric" and "other variants of the S.B./5 may appear during the research process." America already has a variable-sweep fighter—the Grumman XF10F Jaguar.

Douglas X-3. Great secrecy surrounds this most radical research aircraft. Although designed for Mach numbers of about 3, it is at present barely supersonic—*Aviation Age* quotes 740 m.p.h. at 30,000ft—and is powered by two J-40 turbojets. Rockets are certain to be fitted later.

Canada

Avro Canada CF-100. The gross weight of this all-weather fighter, which recently achieved supersonic speed, is quoted by the makers as 17 tons. On a recent flight Air Marshal Curtis, who will retire from his post as Chief of the Air Staff, R.C.A.F., on January 31st, rolled the aircraft once and touched 575 m.p.h.

Miscellaneous Developments. It is learned that the first Canadair-built Lockheed T-33 jet trainer was flown early in November. Components and assemblies of the Beech T-36 are now in evidence in the Canadair shops, and a production line is taking shape. The fuselage mock-up of the CL-21 "Dakota replacement" transport has been completed and is ready for visitors. The first Orenda-Sabres are due in June this year.

The Cartierville branch of the Canadian Car and Foundry Company is now closed (Canadair are using the floor space) and all activities are concentrated at Fort Williamson, where a Harvard line was started a year ago.

As for engines, the new factory which is to build the Rolls-Royce Nene at Montreal, on the Dorval road, is practically finished, while Bristol's new engine-overhaul factory near Montreal is under construction. The Canadian Pratt and Whitney company is now in production with the R-1340 Wasp.

U.S.A.

Convair XF2Y. Contrary to earlier reports, the Convair hydro-ski fighter prototype is not powered by J-57 turbojets, but by a pair of Westinghouse J-34s with afterburners. When convenient these will be exchanged for two J-46s of higher thrust. Unusual features abound in this design: the cockpit resembles that used on the Douglas Skyray and is barely wide enough to accommodate the pilot's head; the hydro-skis themselves retract beneath the forward fuselage; and the wing thickness/chord ratio appears to be no more than about five per cent.

Republic F-84-F Thunderstreak. That this swept-wing fighter, powered with a Curtiss-Wright-built Armstrong Siddeley Sapphire turbojet, outperforms "any airplane in its class anywhere in the world and is vastly superior to the Mig-15" is the contention of Mr. Roy T. Hurley, chairman and president of the Curtiss-Wright Corporation. Mr. Hurley added that the F-84F can fly from New York to Chicago (a distance of 720 miles) in approximately 1 hr. The Sapphire, he said, has proved itself an all-weather, all-climate engine, and is the most powerful turbojet to complete the U.S.A.F. military climatic test at extremes of temperature, ranging from Arctic cold to equatorial heat. The engine has built up a tremendous reputation among military pilots for being "always ready to fly."

France

Prototypes. Due to fly in France during this month are the Hurel Dubois HD.31 twin-engined transport; Morane 755 twin-jet light trainer; a version of the S.O.30 transport, powered with SNECMA Atar turbojets; and a new Sud-Ouest type, designated S.O.1220. Tests will be resumed on the S.O.4050 Vautour attack bomber, Fouga 170R jet trainer, and a new version of the Matra-Cantinieau helicopter.

Fouga 170R. The Fouga company has just been advised of a pre-production order for five of these jet-propelled fighter/trainers.

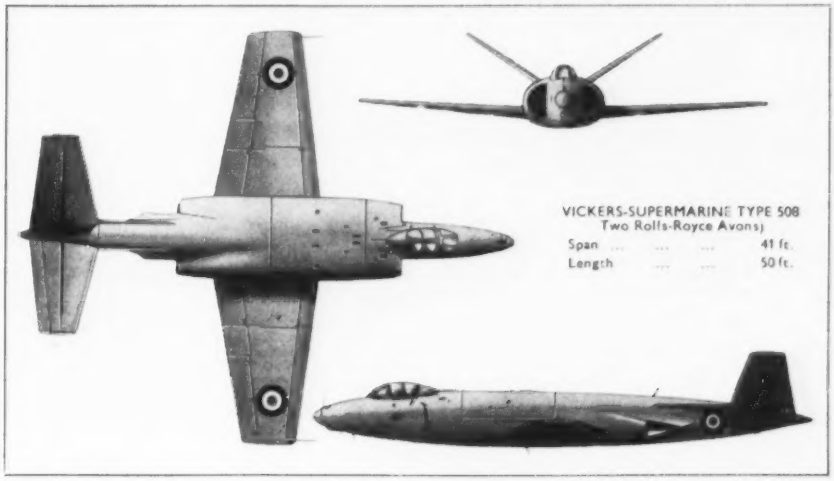
Sweden

Saab-210 Draken. This tiny delta-wing research aircraft, which, incidentally, is described by its makers as a "double" delta, has now completed more than 150 test flights. Notwithstanding the relatively low thrust of the Armstrong Siddeley Adder turbojet (1,050 lb) it is said that the take-off run is "fairly normal" and the speed comparatively high.

Use of Napalm. Although it appears that the Royal Air Force has never been "sold" on the use of napalm, probably due to the inaccuracy of the containers, the Royal Swedish Air Force, which has a very highly developed ground-attack force, regards napalm "bombs" as standard equipment. In a recent display Saab-21A (A-21A) pusher attack aircraft of the F6 Attack Wing, based at Karlsborg, gave a napalm demonstration and on that occasion it was stated that "Sweden is rather well supplied with this latest and valuable air weapon." The heat generated, incidentally, is about 2,000 deg C.

Jugoslavia

First Jet Aircraft. Jugoslavia produced her first jet-propelled aircraft during December and the prototype is now being tested by an air force pilot, Capt. Tugomir Prebeg. It is said to have shown itself to be "highly manœuvrable and up to modern standards." It may be noted that, although Jugoslavia has been promised American jet fighters, none has been delivered to date. Jugoslav Air Force officers have expressed anxiety because the Soviet satellite neighbours of their country have already been supplied with jet aircraft.



SOVIET BASIC TRAINER

Constructional Features and Equipment of the Yak-18

FOR obvious reasons, it is seldom possible to obtain anything like a detailed description of a Soviet aircraft, and for this reason the following details of the Yak-18 basic trainer are worthy of note, though constructionally the machine seems to be conventional. If the description, in places, appears to emphasize some unimportant features and possibly ignore others of greater importance, this is due to the fact that we are dependent for the account on a "one-way" Polish-language source.

THE Yak-18 has been in the news several times during the past year or two by virtue of record-breaking flights over various distances for aeroplanes of its weight category. As its prefix indicates, it was designed by A. S. Yakovlev, and it is now replacing the obsolescent UT-2 (also a Yakovlev design) as a basic trainer. Like its predecessor, it is a single-engined low-wing monoplane with tandem seating, which the Russians seem to prefer to the side-by-side arrangement: they say that tandem seating prevents the instructor helping the pupil too much and thus making it difficult for him to use his own initiative when eventually flying solo.

A canopy replaces the UT-2's open cockpits, though examples of the latter type have on occasions been experimentally fitted with a "greenhouse." The undercarriage, unlike that of most other aircraft in the same category, is retractable. This feature, combined with clean lines, helps to give the Yak-18 its relatively high speed.

The engine is an unsupercharged five-cylinder M-11 single-row radial, giving 160 h.p. for take-off and having a normal rating of 140 h.p. Either of two different types of two-bladed v.p. metal airscrew may be fitted, depending on training requirements.

Compressed air from bottles carried in the aircraft and replenished by an engine-driven two-stage compressor is used for starting, and the same source serves for the actuation of brakes and flaps. A bottle is kept in reserve for emergency undercarriage-operation.

The Yak-18's M-11 five-cylinder radial is closely cowled. Standing alongside is Mario Drigo, a Soviet woman pilot, who has gained a number of class-records in aircraft of this type.

The undercarriage appears to retract rearwardly—but not completely—into wheel-wells in the centre-section.

The Yak-18 apparently has a lively performance, the top speed in level flight being quoted as 275 km/hr (171 m.p.h.). It climbs to 1,000m (3,280ft) in 5 min, has a service ceiling of 6,000m (19,680ft) and has a range of 1,000 km (621 miles).

Constructionally, the Yak-18 is divided into wings, fuselage, tail unit, undercarriage and control system. The wing centre-section is rectangular and the outer sections taper to rounded tips. Both the centre-section and the outer sections are of conventional two-spar construction; the front spar is of double-T section and the rear spar of channel section. To provide adequate wing stiffening and resistance to torsion, the ribs—mainly of vee-braced construction—are supplemented by additional tensioning ribs braced by diagonal wires. The whole of the centre-section is covered with light-alloy sheet, but on the outer sections only the area forward of the front spar is thus treated, the remainder of the wing being fabric-covered. The flaps, below the trailing-edge of the centre section, can be operated from either cockpit. The ailerons, fabric-covered except for their nose torsion-boxes of dural sheet, have trimming tabs. A landing light is fitted in the port wing, just outboard of the centre-section joint.

The steel-tube fuselage is of vee-braced construction, consisting of four longerons positioned by transverse bulkheads profiled to give a partly rounded cross-section. There is metal skinning as far as the rear cockpit, and thereafter fabric covering. On each side of the cockpit area are three detachable panels which permit easy inspection and repair of control mechanism and cockpit equipment, and there is a similar panel under the fuselage.

FACTS ON HYDRAULICS

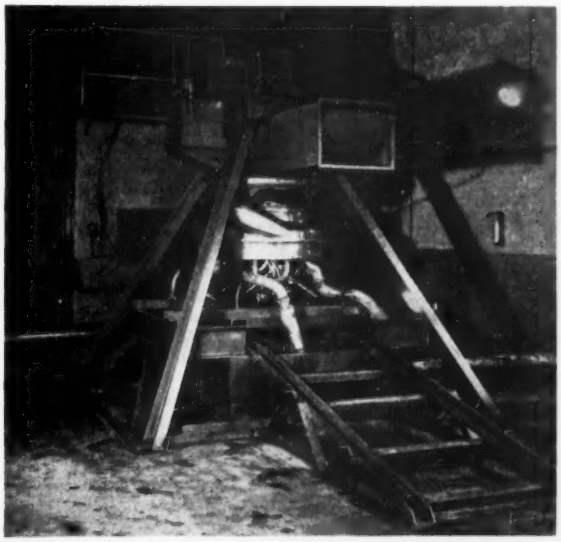
AN impressive example of the amount of hydraulic equipment carried in the large modern aircraft is given in recent news from British Messier. A good idea of the increased complexity of present-day machines can be obtained by considering the length of hydraulic piping necessary to operate the various services: typical figures for last-war types were 200-250ft for bombers such as the Halifax and Lancaster, while the comparable large machine of today has over 1,200ft, and in some cases as much as 1,500ft—an indication of the increasing applications of modern hydraulics.

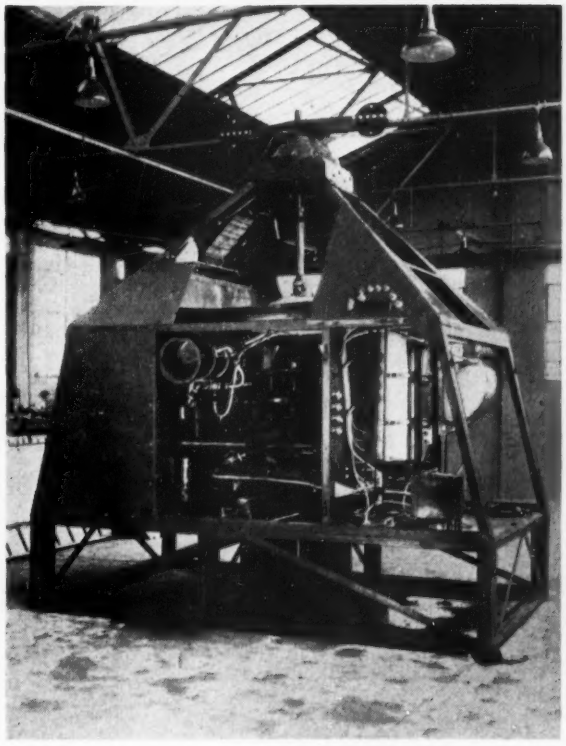
The number of individual components in an hydraulic system is also a clear measure of the degree of complexity, and this figure has increased from 51 on the Lancaster to over 150 on an equivalent modern aircraft. With such additions has come the need to save weight, which has been done by raising the pressure level, thus permitting a reduction in component-size. British Messier's new range of hydraulic equipment has consequently been designed for operation at 4,000 lb/sq in. Among the aircraft in which it is installed are the Bristol Britannia and two other large types, one of which is on the super-priority list.

TARMAC OBSTRUCTION

A CAR driver who, having business at London Airport, drove his vehicle onto the apron without the required authority, was fined a total of £15 at Uxbridge recently on two summonses for contravening the Air Navigation Order (1949). He was also ordered to pay 12 guineas costs. It was stated that the car came into collision with a taxying T.C.A. aircraft, as a result of which the vehicle was struck and damaged by one of the airscrews. The service was delayed for two hours.

LEONIDES ACTIVITIES





A GOOD deal of interest has been occasioned by the announcement, towards the end of last year, of plans to develop and build a 14-cylinder two-row Alvis radial to be known as the Leonides Major. Such a unit is required for both fixed-wing (A.LE.M. 1-1) and vertical-shaft (A.LE.M. 1-2) helicopter installation. In the meantime, the well-established nine-cylinder Leonides is being produced at an increasing rate as trainer and helicopter demands build up. Engine erection at Coventry, on mobile assembly stands, is the subject of one of the illustrations above (right).

Two other activities concerning the testing of vertical-shaft Leonides are also depicted. The two top photographs are of a special winterization-test stand, seen after construction and, later, in use at the Ministry of Supply Winterization Experimental Establishment at Watson Lake, Yukon. Various tests of this kind have been going on for two years past—with credit to the Leonides, it is learned—but results are still being treated as confidential by the Ministry. Mr. P. H. Watson, Assistant Director of Aircraft Research and Development (Technical) is at the present time visiting the cold-weather station.

In the lower left picture is shown what is believed to be the first bed designed to test a helicopter unit with shaft vertical. All the tests made on the normal types of horizontal bed can be carried out, and the special water-brake seen above the engine is a Heenan and Froude product. The particular engine is the Leonides 524/1 as used in Bristol helicopters.

RADAR GUNSIGHT

A Partial Lifting of the Security Veil from American Fighter Equipment

AT the present time the armament of fighter aircraft is in the throes of a major upheaval. We say "throes" advisedly, for valuable time has been lost in more than one country by failure to appreciate the probable requirements; and discussion is still sometimes heated when the relative merits of small- or large-calibre guns or air-to-air rockets or guided missiles are the topic.

In any such discussion, only one fact is really certain : it is that, no matter what the armament, it will be all but useless unless the aircraft which carries it is equipped with a good radar gunsight. Recent Korean fighting appears to have converted all who have taken part to this way of thinking. Even now, however, very little can be disclosed about radar gunsights; their applications to turreted weapons are many, and we may recall the radar gun-laying tail-turret carried by the Lincoln for upwards of six years and the completely automatic tail turret to be fitted to several American bombers, including the B-47B, the RB-66A and the A2J.

Radar sighting on fighters is usually less obvious, and for this reason we welcome the appearance of a brief note on such devices which appeared in a recent issue of the American journal *Air Trails*. The account opens by quoting two of the people best fitted to speak on the subject. The former, an armament officer of F.E.A.F., said : "If any one factor accounts for our combat score against the Mig-15, it is the radar gunsight." And the other speaker, a pilot from the 27th Fighter Escort Wing—the first unit to use the A-1 sight in combat—was equally emphatic : "Our outfit and other fighter-bomber units have been making some remarkable hits with rockets and bombs as well as our gun armament. The sight has more to do with this than any single factor, including skill or luck."

The standard American fighter sight consists essentially of two parts : the AN/APG-30 radar ranging unit coupled with the A-1CM gun, bomb and rocket sight. The basic design is credited to Dr. Charles S. Draper, head of the department of aeronautical engineering at the Massachusetts Institute of Technology. Production of the equipment was turned over to the Sperry Gyroscope Company and it has since been built in very large numbers. The Thunderjet was the aircraft selected for the sight's service trials, the F-84E-25 series being the first production-line aircraft in which it was fitted.

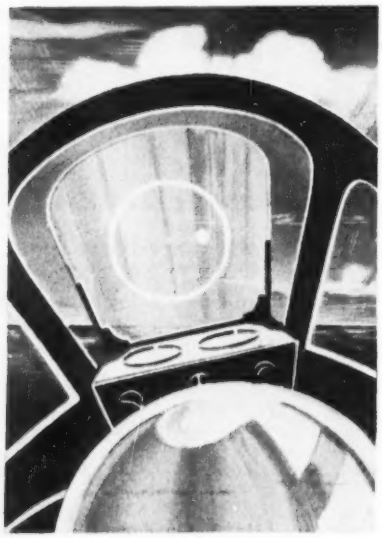
Unfortunately, little can be said of the method of operation of the equipment, notwithstanding the fact that many F-84s and F-86s have fallen, more or less destroyed, into Communist hands. The best that can be done is to present the accompanying drawings—prepared from *Air Trails* illustrations—which reveal something of the nature of the installation.

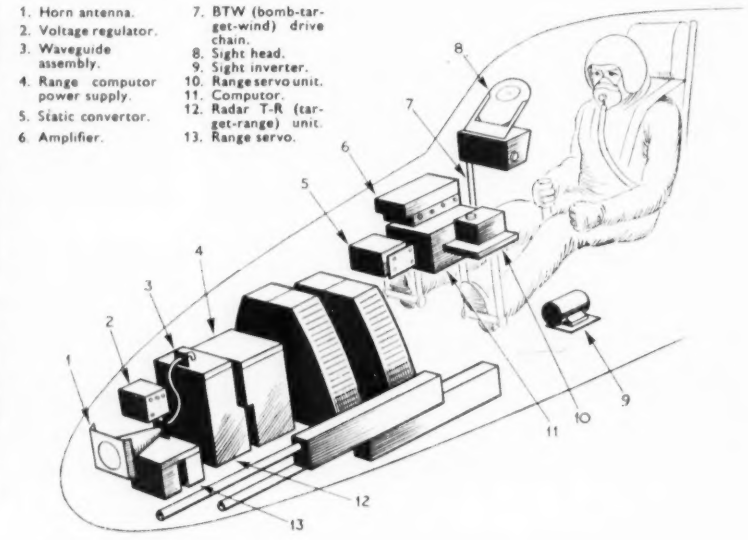
The sight can be switched to air-to-air or air-to-ground work at will, and can be used for any normal airborne weapon. Search radar is, presumably, not fitted—so the pilot still has to find his target and then track it by centering the spot of light (see the smaller illustration) on the target circle. But the sight does everything else. For air-to-air work, it determines range, deflection, and any other factor necessary for good shooting. For ground attack, range along the weapon's trajectory, windage, drift, and any peculiar characteristics of the missile, are all accounted for.

In most day-fighter installations the aircraft remains under the control of the pilot, who follows the target in the classical manner. And if the range, proximity of the ground, or destruction of the target so require, range control can be effected by hand. But in some versions—our contemporary quotes the A-1C—the sight flies the fighter, by coupling with the normal autopilot installation.

In Korea, pilots are reported to have achieved results which would be considered impossible with a conventional gyro sight. Hits, and even kills, have been made at ranges of 2,000 yards—well over a mile—and all this at speeds and altitudes roughly double those of the late war. Moreover, by providing equipment capable of detecting enemy aircraft at night, in bad weather, or beyond the limit of human vision when the sky is clear, the A-1 and J-1 radar sights have conferred upon the standard single-seat fighter much of the all-weather and night-flying capability of the bigger and more costly two-seater. This is reflected in the recent decision to cut back heavily upon production of the Douglas Skynight, Lockheed Starfire and Northrop Scorpion, and boost production of several American single-seaters.

The pilot (left) lines up the fighter in order to centre the radar "pip", or target image, in the gunsight circle. As the fighter banks, two gyros tilt a mirror device in the sight head; then, when the pilot corrects for mirror tilt by turning to centre the "pip" a computor supplies correct deflection. The "pip" glows very brightly as the target comes within shooting range at 2,000 yards. The three switches seen are, from the left: bomb-target-wind scale; weapons selector; and rocket-setting unit. The complete installation (right) weighs some 80 lb. The APG-30 radar range unit acts as the "eye" for the computers 4 and 11. These three units comprise separate, but linked, assemblies for sensing deflection, elevation and g-loading; the first two are gyroscopic and the third a gravity-drop device for bombing.





THE YEARS AHEAD . . .

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STOPWAYS AND CLEARWAYS

I.C.A.O. Introduces a New Concept in Runway Design

AS Mr. R. E. Hardingham, secretary of the Air Registration Board, pointed out recently in his informative R.Ae.S. lecture on airworthiness, the war produced a generation of aeroplanes with higher take-off and landing speeds and, consequently, poorer prospects of safe forced-landings. In pre-war days it was possible to maintain high standards of safety without insisting that transport aircraft should conform to an elaborate set of performance requirements. It was not found necessary, for example, to enforce regulations defining the ability of an aircraft to cope with engine-failure at a critical point during take-off.

By contrast, the post-war years have seen many thousands of expert man-hours devoted to this single problem. Take-off performance is normally the most important factor influencing the amount of payload which a given aircraft can lift from a given aerodrome. In turn, the usefulness of an airport (provided, of course, that it qualifies as a traffic-centre) is largely expressed in the amount of take-off distance offered to airline operators. This all-important relationship between aircraft and airport was the subject of fruitful study at the last session of I.C.A.O.'s Aerodromes, Air Routes and Ground Aids Division, held in Montreal from October 21st to November 20th. Delegates spent several days discussing two promising methods of enabling airports to meet the requirements of traffic with minimum penalty in time and cost—namely, the use of the "stopway" and the "clearway," extensions of the runway which should enable better use to be made of present and future airports.

A few definitions are essential at this point.

Take-off safety speed (V_2) is the minimum speed at which the pilot is allowed to "unstick." This speed is fixed by the manufacturer of the type of aircraft concerned.

Critical speed (V_1) is the speed, fixed by the operator, at which sudden and complete loss of power from the critical engine (the engine whose failure has the most unfavourable effect on performance and handling) is assumed to occur. If the failure occurs below V_1 the pilot must abandon the take-off. If the engine fails after V_1, he continues the take-off. Critical speed is normally less than, or at the most equal to, V_2; but it must be greater than the lowest speed at which the aircraft can be manoeuvred safely on or near the ground if the critical engine fails.

What if the critical engine fails at the critical speed? The pilot would have the choice of braking until the aircraft came to a standstill (the complete operation is entitled "accelerate-stop"), or of continuing to accelerate until he reached safety speed in order to take-off and climb on reduced power. The term *take-off distance* is applied to the distance between the start of the take-off and the point at which the aircraft, climbing on reduced power, clears a 50ft "screen."* This and other terms are illustrated overleaf.

The assumption that an engine might fail at the critical point is an essential one, but the incidence of such failures is rare. It follows that a runway built to the requirements of an aircraft which demands a long take-off distance will not be fully utilized. The A.G.A. session concluded that the portion of the runway used only for the accelerate-stop operation could safely be built to lower standards of strength than the main length of paved runway; this area was dubbed the "stopway." The term "overrun" was rejected as it is already used with a different meaning in the U.S.A. No paving at all is needed for the second part of the take-off distance (from "unstick" to "screen" height); it was concluded, therefore, that the existence of a "clearway" upwind of the runway and stopway would be a useful and economical extension, requiring only to be free of obstructions.

The following official definitions were adopted :—

Stopways are portions of the aerodrome declared available for accelerate-stop purposes in addition to the take-off surface in the direction of take-off. These portions, together with the runway, constitute the take-off area as defined in Annex 6 [an I.C.A.O. document setting out standards for the operation of scheduled international services], while the runway itself constitutes the take-off and landing surface.

Clearways are portions of the aerodrome augmenting the take-off area in the direction of take-off and declared suitable to be taken into account for the purpose of determining the take-off distance available, within the terms of Annex 6.

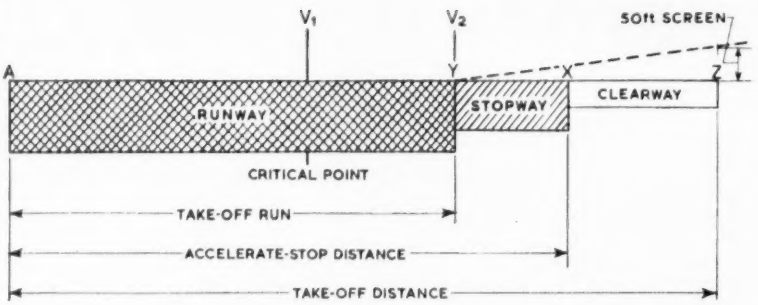
The question of dividing the take-off distance available into three suitably proportioned sections—runway, stopway and clearway—is a somewhat complex one. Since V_1 is a variable, its value being decided by the operator, the proportions of the three sections are dependent upon the ratio V_1/V_2 (assuming that take-off distance is being related to the performance of a particular type of aircraft). A low V_1 means that, if the critical engine fails, the accelerate-stop distance is reduced; the take-off distance, however, is increased, since a greater proportion of the take-off is made at reduced power. In this case the emphasis is on the clearway. Conversely, a high V_1 results in a better take-off performance (since the aircraft is nearer to safety speed), and a less favourable accelerate-stop distance—requiring a longer stopway.

It is, of course, possible to find a V_1/V_2 value giving equal accelerate-stop distance and take-off distance. This equal-distance critical speed has normally been the one assumed in tailoring the length of the conventional runway to the performance of a particular aircraft, since it results in the shortest possible length. Realizing, however, that local conditions, both physical and economical, will sometimes affect plans to extend a runway, A.G.A. delegates evolved a simple method of proportioning the optimum stopway and clearway distance according to performance of the aircraft involved. In particular, construction of stopways at each end of a runway may frequently be an economical first stage in its extension. To take full advantage of such an extension, an operator might find it necessary to select a higher critical speed. Further calculations showed that the limiting length of a stopway would be approximately one-fifth of the length of the conventional runway for four piston-engined aircraft. In the case of an airliner powered by four gas turbine engines, the ratio is one-sixth.

**The height of the hypothetical screen is likely to be reduced from 50ft to 30ft.*

New commercial aircraft produced in this country, such as B.O.A.C.'s Comet 1s, are required to meet the standards set by the latest British performance code, introduced pending the resolution of I.C.A.O. standards for airworthiness. Take-off performance is covered by the Air Navigation Regulations, which require that provision be made for loss of power at a critical point. This article discusses the relationship between take-off and runway length, and reviews recent I.C.A.O. progress in this direction.

"Flight" photograph.



Terms used to describe take-off performance are visually defined by this diagram, which shows how a pilot can make use of the stopway (or, alternatively, both the stopway and clearway) if an engine fails at critical speed. If he decides to accelerate-stop, the aircraft comes to rest within the "take-off area" (AX), also referred to as the accelerate-stop distance; on the other hand, he may continue the take-off to clear the "screen" at Z by a specified margin (the aircraft is also required to clear subsequent obstacles by an increasing margin. AZ is known as the take-off distance. For purposes of clarity, the aircraft is assumed to use all available space; thus, the take-off run (AY) is equal to the take-off surface.

STOPWAYS AND CLEARWAYS . . .

It was finally recommended that stopways and clearways should be provided when "various economic considerations" indicated that operational requirements could best be met by their use. Some further recommendations were made as to the physical characteristics of stopways and clearways. Certain minimum widths (varying between 100 and 200ft) are specified for runways, and it is further required that these widths be augmented by strips on either side of the runway. (The distance between the runway centre-line and the outside edge of the strip varies between 250 and 500ft according to the classification of the runway.) The stopway must have the same width as the runway it augments and the clearway should be as wide as the corresponding strip. Maximum values for slope angle were also decided.

The question of defining the required strength of a stopway provoked considerable discussion between delegates; their recommendation was finally phrased as follows: "The stopway should be so prepared or constructed to enable aircraft which the runway is intended to serve to run over it in exceptional cases and without hazard at the operating speeds that might be expected in this area after the interrupted take-off."

As clearways and stopways are liable to be used as approach paths, it was agreed that approach light fittings could be installed in either, provided that such fittings were breakable and unlikely to cause serious damage to aircraft.

Since I.C.A.O.'s performance requirements for aircraft are still in the development stage, recommendations made during the A.G.A. session were intended only as guidance to airport designers during the interim period. The new concept of a three-part runway must be considered not only in relation to standard aircraft performances, but in relation to the effects of high temperature and elevation. It would be pointless, for example, to build a clearway catering for an aircraft's engine-out take-off performance if, under high-temperature conditions, the rate of climb were insufficient for it to clear obstacles upwind of the take-off area. These simple rules were therefore framed to allow for the effects of elevation and temperature in deciding on runway dimensions: the basic length should be increased at the rate of 7 per cent per 1,000ft elevation above mean sea level; this corrected length is further increased at the rate of 1 per cent for every 1 deg C. that the aerodrome "reference temperature" exceeds the temperature in the standard atmosphere for that elevation. A specific study of local conditions is required when corrections by this method exceed 35 per cent.

At present the relationships between performance requirements and aerodrome lengths are complicated and often far from satisfactory, but the I.C.A.O.'s work in evolving systems of standards is bringing continuous improvement. Meanwhile, progress will depend largely on co-operation between the airport authorities and the airlines. As the concept of the three-part runway takes effect, operators will find it necessary to keep close watch on changes in aerodrome characteristics if the potential advantages of stopways and clearways are to be fully realized.

* *Copies of an I.C.A.O. document which discusses the subject in greater detail ("Aerodromes, Air Routes and Ground Aids Division: Report of the Fifth Session") may be obtained at 5s. 2d. from Her Majesty's Stationery Office, P.O. Box 569, London, S.E.1*

THE VALUES OF PROTOTYPES

THE impressive sums of money for which various British prototypes were insured while flying at Farnborough, were revealed at a recent meeting, in London, of the Insurance Institute. Members had assembled for a talk on aviation insurance by Capt. A. G. Lamplugh, underwriter and principal surveyor of the British Aviation Insurance Co., Ltd.

His talk was followed by a showing of the Shell film of last year's Farnborough display; and, as a supplement to the soundtrack commentary, the audience were quoted values for several of the aircraft depicted. The machines and the amounts mentioned were as follows: Hawker Hunter, £140,000; Vickers-Supermarine Swift, £135,000; Vickers Valiant, £750,000; Vickers-Supermarine Type 508, £230,000; Fairey Gannet, £100,000; Short S.A.4, £500,000; Gloster Javelin, £250,000; Avro 707B, £160,000; Avro 707A, £180,000; Avro Vulcan, £700,000; Bristol 173, £100,000; Bristol 171, £38,000; Westland S-51, £22,000; Saro Skeeter Mk. 4, £11,500; Bristol Britannia, £500,000; D.H. Comet (Mk. 1 prototype), £500,000; Vickers-Armstrongs Viscount, £250,000.

The Saunders-Roe Princess flying-boat, the audience were told, was not fully insured while flying, but was covered against accidents "on the ground" to the extent of £1,500,000. No sum was quoted for the D.H.110, which was destroyed during the display.

It can be misleading to express the value of a prototype in precise terms of £ s. d. The true value of such an aircraft varies according to the amount of useful knowledge and experience which it yields. In some cases, the sums quoted seem to be based solely on the manufacturing costs involved; production Britannias, for example, will cost more than the sum for which the prototype is insured. On a £/lb basis, the most highly insured machines are the Avro delta-wing research types, followed by the fighters and the twin-engined helicopter prototype. Values quoted for the bombers appear to be higher, in proportion to weight, than those for the airliners.

In his lecture, Capt. Lamplugh traced the earliest beginnings of aviation insurance, remarking that he still possessed a proposal issued in 1910. An interesting reflection on the increased safety of airline travel was provided by the fact that in 1918 insurance was the second or third item in the cost of commercial air transport; today, it was only seventh or eighth. In 1919, however, the total premium market in this country was only £50,000, and the amount which might have been paid out was obviously much greater.

Discussing the handling of claims, he observed that it was an unwise practice to re-insure with foreign companies inexperienced in aviation. As an example of the changing values encountered in air-transport insurance, Capt. Lamplugh pointed to the DC-4, originally sold for £50,000 and now in some cases insured for up to £250,000. There were virtually no spares for these aircraft (the fact that manufacturers retained the copyright of aircraft repair schemes was one of the important differences between aviation and marine insurance), and every one was a potential total loss. The lecturer showed slides illustrating the impressive increase in values with increased all-up weight and wing loading. Cost of repairs was also rising as a direct result of increased complexity.

The quality of surveyors was most important, not only to individual companies but to the market as a whole. The speaker felt there was much to recommend an independent technical pool of resources under the control of a suitable committee capable of advising on the more technical questions.

To support his belief that official accident investigators are prone to overlook evidence and draw wrong conclusions, Capt. Lamplugh quoted the case of a Canadian airliner which disintegrated in the air. The official conclusion was that no explanation could be found, but the company bought the entire area and erected a building over the scene of the crash. After months of research the cause was traced to a bomb explosion and the man responsible was finally brought to trial and executed. It was unfortunate, said Capt. Lamplugh, that the power of the Accident Investigation Branch had been strengthened under new regulations.

In conclusion, the lecturer outlined some of the more important problems which would confront the insurance market in the near future. These included the question of insuring aircraft leased to independent operators for trooping; of tourist services operated by high-density aircraft; and of helicopters, which must still be regarded as potentially dangerous.

MASS PRODUCTION OF SAPPHIRE ENGINES

U.S. AIR FORCE ORDER

WASHINGTON, Dec. 12.—Mr. Gilpatric, Under-Secretary of the United States Air Force, announced to-day that orders had been given for the British-designed Sapphire jet engine to be mass-produced and he expected hundreds of them to be delivered within the next six months.

The Sapphire, he said, "has successfully passed the rigid 150-hour model test which the Air Force imposes on all new engines before releasing them for mass production. We are extremely optimistic concerning the future of this engine as a result of its excellent performance in recent flight tests in the first F 84 F (Thunderstreak) aeroplane."

He said the Sapphire engines were now in use in some operational aircraft, and a "considerable number more" were coming from the aircraft factories. The Sapphire engine was designed by the Armstrong Siddeley Company in Britain, and is being produced in the United States by the Curtiss-Wright Aircraft Company and the Buick division of the General Motors Corporation.—*Reuter.*

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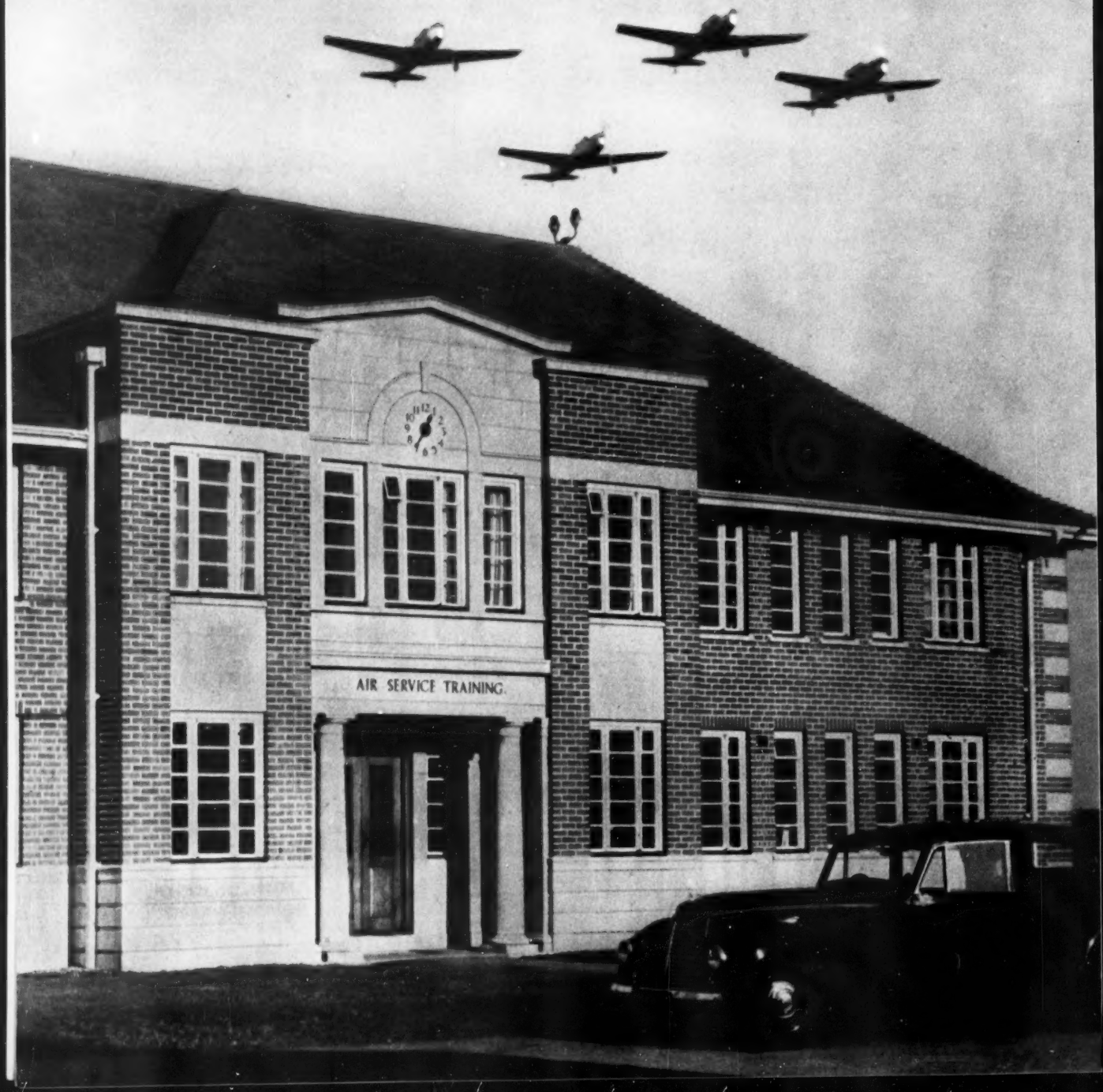
FROM OUR OWN CORRESPONDENT

NEW YORK, DEC. 12

The performance of *Carmen* at the Metropolitan Opera House last night was heard and [illegible] not only by the 3,000 persons in the [illegible] but by nearly 70,000 others in [illegible] cities to which it was relayed by [illegible] the first time that a stage production has been transmitted on a closed television circuit to paying audiences in 31 cinemas. Prices paid by the remote audiences, fixing its own scale, ranged from $1.60 a seat.

The Times Dec 13

The de Havilland Chipmunk joins "Britain's Air University"



CONSTRUCTOR AND OPERATOR

Value of Early and Continued Liaison: The B.E.A. Viscounts as an Example

By R. C. MORGAN, O.B.E., F.R.Ae.S.

IN this important and informative article the chief project and development engineer of British European Airways Corporation tells a story of enthusiastic co-operation between producer and user that incidentally points a moral for other spheres of commerce, far too many of which, in these days, sadly lack such a mutually beneficial spirit. Mr. Morgan's review of Vickers-Armstrongs Viscount development in relation to the specific requirements of B.E.A. reflects great credit on the technical staffs of both concerns; and, as he shows, other users of this fine turboprop aircraft will benefit from the six years of close collaboration soon to culminate in the opening of scheduled passenger services by "Discovery"-class Viscount 701s.

BEHIND the news of the Viscount orders placed by Trans-Canada Airlines and other operators abroad lies the story of six years' co-operative effort between Vickers-Armstrongs aircraft design team and the engineering department of British European Airways. Beginning with discussions with the late Rex Pierson and with Mr. George Edwards in 1945, liaison on the project has continued throughout all the design and development stages.

A great tribute to the design and manufacturing skill of the Vickers team, the Viscount exemplifies the result which can be achieved when the views and experience of the manufacturer and the operator are successfully blended and, in particular, when this interchange can take place right from the start of the design.

B.E.A.'s project and development staff have been in a unique position in this respect, for they are responsible both for the current development of all airborne equipment in service and also for obtaining and introducing new equipment. In carrying out the former responsibility they are in daily touch with any defects and difficulties, and with the developing ideas and requirements on all sides within the airline. Thus they are well able to specify the requirements for new equipment and advise the manufacturer as it is designed and developed.

In 1945 the writer undertook the task of getting together a team to do this work and, of course, the prime requisite became good co-operation with the manufacturer of the equipment. The early work on the Viking enabled the Vickers design staff and the B.E.A. development engineers to get to know each other and paved the way for the co-operation on the Viscount. At the outset, care was taken to ensure that the staff on both sides understood quite clearly where responsibility and authority lay and, in particular, that the basic design responsibility rested with the manufacturer. The way in which the design has been engineered and continually re-tailored to meet the operator's requirements speaks well for the co-operative and progressive attitude which George Edwards inculcated into his team.

When the initial prototype order had been placed by the Ministry of Supply and the decision made to use the Rolls-Royce Dart propeller turbine, liaison on a similar basis was established with Rolls-Royce, from which stemmed the subsequent decision to operate Dart-engined Dakotas in order to obtain experience of the engine before the Viscounts came into service.

As this is written the acceptance trials of the first production Viscount 701 (B.E.A. *Discovery* class) are nearing completion, and the results of this six years' co-operation are about to be realized.

Viscount Design Development.—The early design-studies in 1945 were for an aircraft to take four of the turboprops then under development, rated at some 800 t.h.p. each. By the time the prototype design began to crystallize, over 1,000 t.h.p. was expected, and the aircraft design was re-tailored accordingly.

By the summer of 1947 and before the first prototype (Viscount 630) had flown, still further engine power was in sight and it became clear that the aircraft capacity could be increased to match it. The studies carried out by the B.E.A. development staff showed how attractive this proposition would be and led directly to the design of the long-nosed Series 700 Viscount, which was finalized by the autumn of 1947.

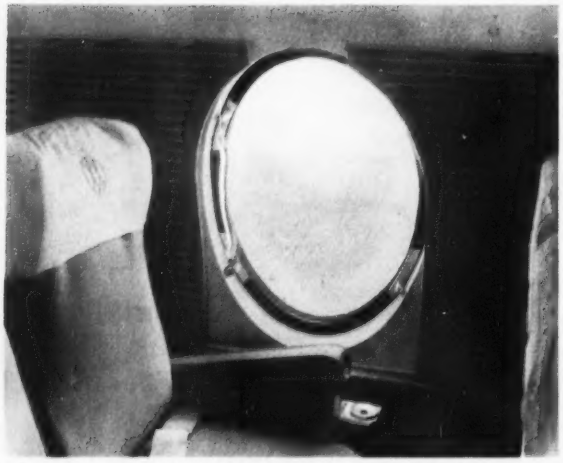
It is very difficult to select a new aircraft type which is capable of development; but we in B.E.A. saw that the best attempt must be made and, when alternative designs were being examined in 1945, we took the view that such possibilities existed in the combination of the Viscount design and the firm behind it.

Some limitation in the liaison between the B.E.A. project and development branch and Vickers inevitably developed from the necessity for switching a lot of our effort to the Ambassador, which was ordered in 1948. However, the study of the performance, economy and operating problems of the turboprop continued whilst the Viscount 700 prototype was being built and flown, the internal layout, colour scheme, design of cockpit, radio and pantry installations being done to B.E.A. requirements. Thus, when the Viscount was finally ordered in August 1950, we were able to push ahead with full vigour.

Those best able to judge the results of this co-operative effort are the actual users, and the degree to which the potential operating economics of the Viscount are achieved will depend largely on the way in which it meets the requirements of those in daily touch with it: the passengers, the aircrew, the stewards, the traffic staff, and the maintenance engineers. It may be of interest to study these aspects under their respective headings.

The Viscount Passenger.—The outstanding point of passenger attraction is, of course, the smooth and vibration-free operation of the propeller turbines. The remarkable thing about the aeroplane is the absence of the exhaust noise and bumping and thumping vibrations which chase each other throughout the structure of any orthodox piston-engined aircraft. It is an unforgettable experience to travel at twenty-odd thousand feet over the weather in so smooth and steady a vehicle. There is good reason to believe that our 1947 estimate of an extra 10 per cent load factor on the Viscount in competition with the noisier piston-engined types will be realized.

In considering the passenger requirements, the operator and manufacturer were agreed on the need for large windows and, following the lead given by the Viking, for each window to be usable as an emergency exit. Quite early on, moreover, it was agreed that failure of the window in pressurized flight must be as unlikely as failure of the main aircraft structure. In a pressurized airframe these various requirements gave rise to some substantial



"Even after many flights in the Viscount, one cannot fail to be impressed by the view given by these windows."

B.E.A.'s red-and-grey colour scheme is used for the Viscount interior, designed to be both pleasant and practical.

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design and technical difficulties. The ingenuity of Basil Stevenson (assistant chief designer) in producing the elliptical window frame in tension, and the extensive development work and tests done by Vickers on the window material, provided the solutions to the problem. Even after many flights in the Viscount one cannot fail to be impressed with the excellent view given.

Apart from the noise and vibration (or, in the Viscount, their absence) and the view one can get through the windows, the design of the interior and the cabin service are the features most noticeable to the passenger.

To mention interior design to most post-war aircraft designers was to tread where angels feared, and to court the answer "You can have any scheme you like—so long as it's the one we are doing." After experiences of so many airline officials expressing their own personal preferences, Vickers were no exception; but when they realized how we were approaching the problem a sound basis of co-operation on the design of the Viscount interior was established. The whole design of the interior furnishing scheme, materials and details was worked out in the following way.

It was agreed within B.E.A. that the writer would be responsible for the interior scheme and, employing a first-class industrial designer as consultant, would transmit his requirements to the Vickers design-staff. Thus, the best possible standard of industrial design was injected and "engineered" into the aeroplane by the operator and aircraft designer. A short length of full-scale mock-up was used to develop the scheme. In the early days of the Viscount 630 prototype the design consultant was Christopher Nicholson, F.R.I.B.A., who unfortunately met his death during the 1948 gliding competitions in Switzerland. The interior of the Viscount 701 series was produced with Mr. James Gardner, O.B.E., R.D.I., M.S.I.A., as consultant. The combination of aircraft designer, industrial designer and operating engineer used in this way proved singularly effective.

Taking the B.E.A. red and grey as the basis of the colour-scheme, we set ourselves the broad target of producing an interior which would be "light and airy," "appropriate to the vehicle," pleasant, and at the same time practical. We aimed in particular at producing an interior out of the orthodox run—one which was unlikely to become dated in three or four years' time. Great care was taken to eliminate as far as possible the tube effect so common in civil aircraft interiors and to use "design tricks" to give an appearance of greater width to the cabin.

The standard of detail finish we set ourselves was not easy to meet, and Vickers' design staff had to tackle each item, particularly as no suitable standard fittings were available in the market. The experience gained in the design of the Viking was invaluable; each detail joint, fitting and surface came in for examination, and special fabric for the walls was designed by Mr. Gardner. The competence with which Vickers mastered the necessary changes in design technique can be seen in the production aircraft. A particular detail of interest is the silent "punkah louvres" which provide individual fresh air for each passenger—an unusual feature in pressurized aircraft. The development of this silent louvre is a story in itself. Others are the design and finish of the light luggage racks, the concealed air-circulation vents and concealed fixings for wall and ceiling panels.

While bearing in mind ease of maintenance, and durability, we kept in the forefront the fact that the interior would stand or fall by the views of the womenfolk. Judging from comments already received, we have succeeded.

Designing for the Pilot.—The pilot has been particularly well catered for and a good deal of the co-operative effort has gone into the front end of the aircraft. The control-cabin layout was worked out in 1946-7 with the aid of a mock-up, and instrument panels, lighting, seats, radio, etc., were laid out to suit B.E.A.'s operating requirements. The good pilot-view which was produced is a measure of Vickers' successful engineering, and the large windscreen panels show how this has been achieved notwithstanding the pressure problem. The co-pilot's station had to be arranged to enable him to do navigation and fuel-control duties, so his seat was made to slide back, and the control wheel to be disengaged and moved up to the dashboard, thus giving him freedom to work his charts. Detail agreement was reached on the layout of the engine instruments and the design of the control and mechanism for the steerable nosewheel.

Great attention has been given to the detail layout of the radio, which is arranged for operation by both pilots and radio operator. The latter has been well catered for in the design and layout of the table and console. A particular development on the operating side is the mixing system which, developed from the old intercom, now enables the crew members to communicate with one another or to transmit and receive as required.

Other items on which the B.E.A. development engineers spent a good deal of time were the layout of the control pedestal, the duplicated braking system and such points as the design of that most important but oft-neglected accessory, the windscreen wiper.

There is a queue in B.E.A. of pilots waiting to join the Viscount flight, and none already on it wish to go back to other aeroplanes.

The Steward.—This member of the crew has all to hand in the forward pantry, which is designed to take the standard equipment already developed by B.E.A., including tray containers, hot-meal boxes and all the other apparatus required to serve first-class meals.

Traffic Handling.—Nothing is likely to give an aeroplane or an airline a bad name and exasperate the passengers more than delays caused through difficulties in loading and unloading. Such difficulties have been minimized on the Viscount by many useful features. The large elliptical doors enable passengers to enter from either end. Great care was taken to provide adequate baggage capacity and the largest possible under-belly holds have been engineered. The forward door provides excellent access to the forward baggage compartment and is also used for loading and unloading the pantry equipment. The rear baggage-hold has its own separate door, whilst the under-belly holds have been designed free from obstruction, with ease of access and with robust door sills and edges. The method of baggage lashing in the upper holds is a particularly interesting development. Many of the lessons learned while operating the Viking have been incorporated into its successor to improve traffic handling.

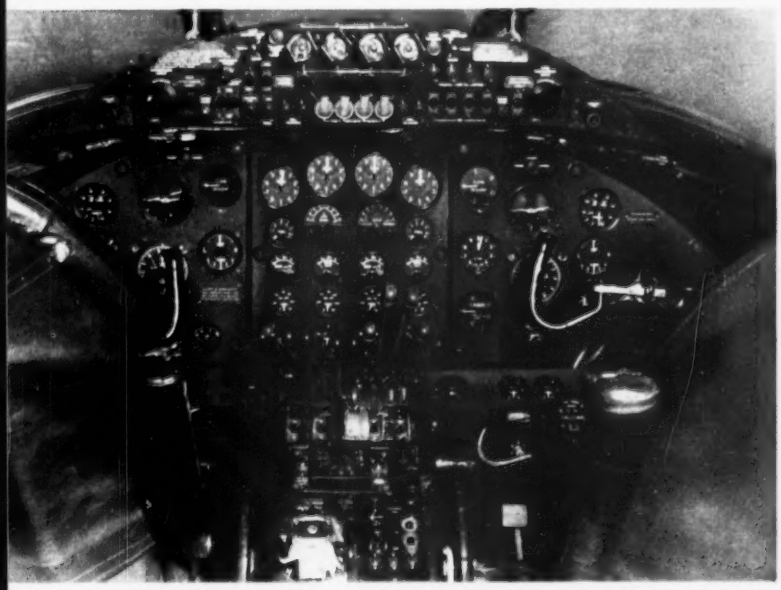
Design for Maintenance.—Ease of access and interchangeability, long life and reliability are obvious *desiderata* presenting a big problem in the design and development of a new aeroplane. On the Viscount much attention has been given to the task of the maintenance engineer in providing clean and accessible component and system installations.

A number of the now well-known B.E.A. maintenance trials have been carried out on the Viscount 700 prototype, and on the production line, to see what difficulties are likely to exist in the

removal and replacement of components during maintenance, and modifications have been introduced on the line to overcome difficulties found.

Particular attention has been paid to the design and location of access panels, position and type of external connections for servicing, and the reduction to the minimum of fittings requiring special tools. The degree of interchangeability is always a difficult question. Many maintenance men are aware of the various and often conflicting requirements which need to be met in this sort of design; they expect to meet physical difficulties in carrying out maintenance, particularly major maintenance and repair, and they delight in finding ways and means of overcoming them. Others incline to the view that every part should be easy of access, simple to remove and completely interchangeable. The Viscount, in common with other civil aircraft, lies between the two. With the relatively small production numbers—compared, for example, with automobile production—there is a definite limit to the interchangeability which can be achieved at a reasonable price.

Considerable effort has gone into obtaining long life and reliability. Extensive bench-testing carried out by Vickers on items such as the flap-retraction gear should result in freedom from trouble for long periods.



The functional tidiness of the Viscount control-cabin is apparent in the view above; the co-pilot's seat slides back to give him access to the navigational table. The radio operator "has been well catered for in the design and layout of his table and console" (right). Likewise the steward, whose forward pantry is shown in the lower right photograph.

For the maintenance man the Viscount promises to be as good in most respects as other aircraft and very much better in others.

Development-flying Experience.—Despite all this effort put into design and work on the ground, there is no real substitute for flying experience in finding out how the job is turning out and what requires modifying. In this sphere the liaison between manufacturer and operator has been most fruitful. Whilst the B.E.A. development engineers have taken part in, or been in touch with, all the test and development flying since the 630 prototype first took the air, there are three particular ways in which the Corporation has been able to gain invaluable experience. These are: the flying of the Dart-engined Dakotas (in which Viscount-type power-plants were fitted and the aircraft used in regular European freight services); the operation of the Viscount 630 prototype on the London-Paris route in regular passenger service in 1950; and the 250 hours proving-flying on the 700 series prototype, just recently concluded.

Under the supervision of the B.E.A. development staff, this flying has been done by the newly formed B.E.A. Viscount Flight under Flight Captain A. S. Johnson. The maintenance of the Dakotas was done in the normal way by the airline, whilst the maintenance of the Viscount was done by Vickers and Rolls-Royce engineers. Apart from developing the engine and finding out what defects might occur on the aircraft, this flying has been quite invaluable in enabling the theory of turboprop operation worked out by the B.E.A. development engineers to be tried out in practice before actual operations begin.

Development in Service.—The 250 hours proving-flying on the Viscount 700 prototype has been notable for the few defects and troubles experienced, particularly those irritating minor defects associated with vibration, of the kind often experienced on piston-engined aircraft. Of course, troubles *have* been encountered, and modifications introduced to overcome them. The delivery of the first aircraft can be considered as only the end of one phase and the beginning of the second, that of development of the aircraft in service. However good the aircraft proves to be, defects and troubles will arise. This occurs with any new equipment subject to heavy usage, and is particularly the case with new civil aircraft where there is a strict financial limit to the amount of component-testing and proving-flying which can be done beforehand.

Modifications will have to be incorporated into the aircraft and its component parts during the routine maintenance cycle. It will be the job of the airline development engineers to investigate the root cause of such troubles and ensure that action is taken to eliminate as many of them as possible. Thus, the present liaison with Vickers will continue long into the service life of the aircraft.

Interchange of experience between the different operators of the

CONSTRUCTOR AND OPERATOR . . .

type will be invaluable, and to this end a regular liaison has already been established between B.E.A., Air France and Aer Lingus. This is being extended to include Trans-Canada Air Lines and Trans-Australia Airlines. Thus, the experience of B.E.A. as first user will be available to the other operators as their aircraft are delivered. With the powerful link already established with the manufacturer, the pooling of experience will enable the Viscount to become one of the leading transport aircraft in the world.

Retrospect.—Six years is a long time, and in a brief account such as this it is difficult to do justice to the interchange of knowledge, experience and ideas which has taken place between Vickers design-staff and the B.E.A. development engineers. Starting right at the outset in 1945, this liaison had by late 1947 resulted in the development of the aircraft from the early 24-seater specification to the 40-47 seater now being delivered; and, although the B.E.A. order was not placed until 1950, the liaison continued throughout this period.

Perhaps the lesson which can be drawn from all this is that a sound working liaison with the engineering staff of an airline is essential, because the manufacturer's design team cannot be expected to possess detailed operating experience, particularly if it happens that the constructor has previously been engaged only on military aircraft. A successful new civil aircraft design cannot, as it were, be produced by a manufacturer *in vacuo*. The first operator, therefore, plays a very fundamental part in the development of a new aircraft.

Of course, the airline development staff is limited and cannot do too many things at once. This must inevitably mean a small number of new aircraft designs, which, in view of the expense, is reasonable enough. In the early days of B.E.A. it was laid down that the development staff could tackle only one new aircraft at a time and had to refuse to advise more than one manufacturer. This has proved to be sound policy, for in any case the sort of results described here can be obtained only when the development engineers know that they are going to get the aircraft and are to be held responsible for putting right eve-ything which doesn't work or which proves unsuitable for airline use. It is one thing to give advice when you hold no responsibility; it is quite another when you know that the advice you give will result in expensive ironmongery for the success of which in service you will share responsibility with the manufacturer.

The historical fact, and one whose importance cannot be overemphasized, is that the Viscount is the first aeroplane B.E.A. has had which has been the subject of operator-manufacturer liaison from the very first day.

ROLLS-ROYCE MARINE GAS-TURBINE

THE Admiralty has recently released some details of gas-turbine power units being experimentally installed in high-speed naval craft.

Shore trials of the new Rolls-Royce R.M. 60 are nearing completion, and the two prototype units are shortly to be installed in the motor gunboat *Grey Goose* (205 tons displacement, 146 ft overall length).

Describing the R.M. 60 engine, the Admiralty says that the necessity for economical low-power cruising demands a high compression-ratio. This is achieved by the employment of multi-stage compression, a heat-exchanger, and intercooling between each compressor.

A low-pressure compressor delivers air through a sea-water-cooled intercooler to a two-stage centrifugal compressor, and intercooling is again employed between each stage of the centrifugal compressor. Air at maximum cycle pressure is then passed through a heat-exchanger, where it is heated by the exhaust gases before being delivered to the combustion chambers. Fuel is injected and burned in each combustion chamber and the resulting high-temperature gas is expanded through three mechanically independent turbines. The high-pressure turbine drives the H.P. compressors, the power turbine drives the propeller through a two-stage reduction gear, and the L.P. turbine drives the L.P. compressor.

By reason of the mechanical independence of the power turbine, this cycle has the advantage of economy at low powers and also provides improved flexibility.

The engine will drive a three-bladed Rotol screw having variable and reversible pitch, which will provide a convenient means of reversing and will also allow variation of engine speed with ship speed in order to obtain the best results at a given power.

Rolls-Royce aero-engine practice has been adopted for many components, giving a light and compact power unit which offers a considerable increase in total power, and a reduction of 50 per cent in total machinery weight, as compared with the lightest comparable steam plant yet produced for naval purposes. In addition, a saving in installation space has been made possible. In connection with these figures, it is worthy of note that the steam turbines originally installed in *Grey Goose* had an output of 8,000 h.p. and gave her a speed of over 35 knots.

Other Admiralty experiments concern Metrovick gas turbines. Following the successful trials of the Metrovick Gatric engine—the name is an Admiralty designation—in M.T.B. 5559 (formerly M.G.B. 2009, which, in 1947, was the first vessel in the world to be propelled by a gas turbine), a contract was placed with Metropolitan Vickers Electrical Co., Ltd., for the design and manufacture of four larger gas turbines of improved performance.

The new units, known as G2s, are of 4,800 h.p. each and follow a design based on that of the Beryl aircraft axial-flow gas turbine originally developed by the same company.

After a series of trials at the Metrovick works, the G2s have been installed in two coastal craft in order to gain operating experience at sea. As in M.T.B. 5559, they are used only for high-speed running; diesel engines are fitted for manœuvring and cruising at low power.

American interest in the installation is apparent from the fact that the U.S. Navy have ordered two G2 units, which will be used for test and evaluation purposes.

EXPANDING AMERICA'S ARMED FORCES

IN his report to the President on the progress made in rearmament during the first half of 1952, Mr. Lovett, the American Defence Secretary, gave figures indicating the expansion achieved in the various Services and at the same time called attention to the tremendously increased complexity of modern weapons. During the two years since the Korean war started, the Army's strength has increased from 600,000 to about 1,600,000, the Navy's from less than 400,000 to about 800,000, and that of the Marine Corps from 75,000 to 230,000 organized in three divisions and three air wings. The Air Force has developed from 48 groups to 95 wings, and from a strength of about 400,000 to one of 980,000, but is still considerably short of its scheduled 143 wings. The cost of the aircraft required for such a force, says the report, can be judged from the fact that the construction of a wartime fighter required the employment of about 42,000 man-hours, whereas no fewer than 1,132,000—27 times as many—are required for a modern replacement.

The report goes on to say that the high cost of the rearmament programme lies also in the conflicting aims which military departments are being asked to pursue simultaneously. "We are," it says, "at one and the same time fighting a war in a distant land, mobilizing and training our man-power, returning experienced personnel from combat in accordance with our rotation policy, and demobilizing trained troops who have completed their tour of duty.

"Similarly, in the production field we are developing the expandable mobilization base of our allies, producing proven equipment for today and improved weapons for tomorrow, providing assistance for our allies by supplying them with initial and training equipment, and maintaining the level of civilian economy to keep this country healthy, so that our efforts to prevent war do not do permanent damage to the system which supports our way of life."

Mr. Fowler, the Director of Defence Mobilization, in a report published the day before that of the Defence Secretary, said that rearmament was in mid-passage, and that much had yet to be done: none the less, production of the new and complicated weapons that were now so essential had been increased seven times since mid-1950. Both Mr. Fowler and Mr. Lovett stressed the ever-growing importance of maintaining America's lead in research and technology and applying the result to improving the equipment of the Forces. Mr. Pace, Army Secretary, confirmed this by saying that "amazing" new armaments were being developed, including "a whole family" of atomic weapons; and Mr. Kimball, Navy Secretary, claimed that a minimum of 12 "super-carriers" of the *Forrestal* class should be ordered to accommodate large jet aircraft.

The Percival P.56 "Provost" trainer with the Alvis Leonides Engine

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FIFTY-YEAR STORY

Older than the Industry: H. M. Hobson, Ltd., Celebrate their Jubilee

Mr. Stanley W. Hughes, the company's present chairman and managing director.

WHETHER or not fifty years is a long time depends upon the span of history against which we set it. If we take it not as a proportion, but as a slice of history in its own right, then its significance probably depends upon the period in which it has its place, according to whether that period is one of stagnation or progress. What is quite certain is that fifty years is both a very long and a very significant time when considered in relation to a manufacturing company whose interests have from the outset been mainly in the sphere of motoring and flying—for half a century ago the motor-car was in its infancy, and the first aeroplane was as yet unfledged, though the time was very near.

Thus a firm whose name is well known to readers of this journal —H. M. Hobson, Ltd.—deserve congratulation on having attained the magic figure; today, almost to a day, they celebrate their jubilee, and in these circumstances a brief review of their growth will not be out of place.

Though mention of the name "Hobson" automatically evokes association with the word "carburetters," in the first few years of the company's existence these components concerned them only incidentally: they started as agents for cycles, then for motor-cycles and cars, with a little office in Basinghall Street, in the City of London, and a works in Wimbledon. The business was founded by Hamilton McArthur Hobson, and his partners were E. A. H. de Poorter and George Cheesman. It is also worthy of remark that they employed a junior clerk: his name was S. W. Hughes, and it will appear again in this story.

Through Mr. de Poorter's Continental connections the firm became concessionaires for varieties of Belgian and French cars, and soon they began to make headway. Before long they were joined by Major (then Mr.) T. P. Searight, who was destined to become the company's chairman some thirty years later.

In 1906 they moved to premises in King's Road, Chelsea, and later to Vauxhall Bridge Road, where they serviced the cars for which they were agents—particularly the Decauville and the Nagant-Hobson. They also went into the motor-accessory business, notably with the French Pognon sparking-plug, a highly successful line.

It was during a visit to Paris in connection with these plugs that Messrs. Hobson and de Poorter met a talented motor engineer, M. Claudel, who had designed a carburetter of obvious merit. By 1908 Hobsons held the concession, and before long they made arrangements for the Claudel-Hobson carburetter to be manufactured under licence by a firm in this country. Incidentally, it is curious to note that economy was the principal sales-point, though in those days petrol cost but a shilling a gallon.

Two years later—in April, 1910—the firm entered aeronautics by obtaining an agency for M. Roger Sommer's new biplane, which they advertised on the front cover of *Flight* at the time. At about this period, too, a Claudel-Hobson carburetter first took to the air: Maj. Searight now shared with Col. Ogilvie the ownership of a Wright biplane and, oddly enough, its engine had a form of direct fuel-injection; but speed-control was uncertain, so a car carburetter—with the body cast in aluminium—successfully substituted.

So far the H. M. Hobson business had been principally a sales and servicing organization, but by 1911 the demand for Claudel-Hobson products had become so great that it was decided to begin actual manufacture, a company known as Accuracy Works, Ltd., being formed for the purpose, with a modest factory (purchased for £825!) in Wolverhampton.

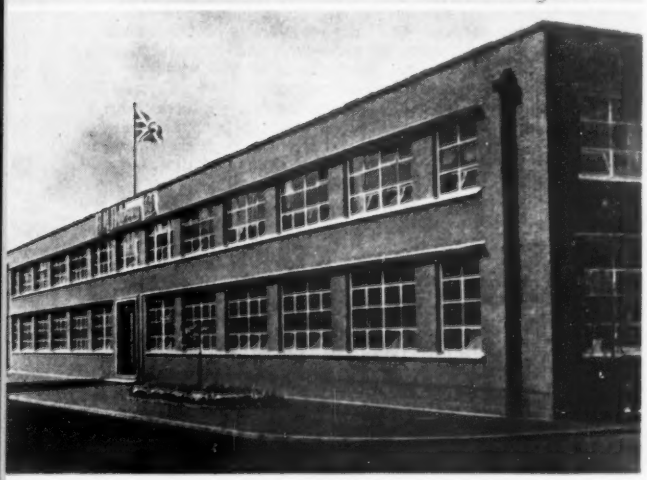
War Production, 1914-18

Soon after the outbreak of the First World War the Accuracy Works found itself busy on hitherto undreamed-of quantities of aircraft carburetters. Claudel's C.7 instrument, used on Hispano engines in France, was developed as the HC.7 for Sunbeam-Coatalen and Liberty engines; and from this came the further-improved HC.8, eventually contracted-out to eight different firms. Towards the end of 1916 the firm received large orders for carburetters (type RRCH) developed in conjunction with Rolls-Royce, Ltd., for use in Eagle, Falcon and Hawk engines.

It was on two particular Rolls-Royce Eagles that, in 1919, Claudel-Hobson carburetters first figured in what was to be, for the company's products, a long succession of historic flights: these two Eagles powered the Vickers Vimy in which Alcock and Brown made the first direct Atlantic air crossing. A few weeks later the airship R.34, commanded by Maj. G. H. Scott, made a two-way Atlantic crossing; and its Sunbeam-Coatalen engines had C.H. carburetters.

After a post-war recession the business began to expand once more, and in 1927 it was found necessary to move the London headquarters into larger premises, this time at Acton Vale. With almost monotonous regularity, in reports of records on land, on water, and in the air, the words "Claudel-Hobson carburetter" appeared in the lists of equipment used by successful aspirants. So far as the aircraft side was concerned, much the most important development during the mid-1930s was the fully automatic altitude-control carburetter, first air-tested on an Armstrong-Siddeley Cheetah, and subsequently developed into the famous "master control" system used on many well-known makes of engine. This development was largely the work of the late Capt. E. Dodson, a gifted engineer who was the company's technical director.

In 1936, ten months after the company had been converted into a public one, with the new title of H. M. Hobson (Aircraft and Motor) Components, Ltd., it lost its founder by the death of Hamilton Hobson. But there were capable men to carry on the tradition: Maj. Searight succeeded to the chairmanship, and under



Before, and for some years after, the First World War the firm occupied premises at Vauxhall Bridge Road, London. The lower view shows the finely designed office-block which now fronts the newly completed extensions at Stafford Road, Wolverhampton.

FIFTY-YEAR STORY . . .

his control the firm undertook an ever-increasing share of work, especially on Air Ministry orders, in the belated, hurried rearmament period immediately before the Second World War.

The start of air attacks on this country in 1940 meant dispersal for the quickly growing Hobson manufacturing facilities. The Acton Vale organization was split into halves, one taking over a works in Bridgwater, Somerset, while the other occupied the original Triumph Motors factory in Holbrook Lane, Coventry. Mainly responsible for equipping the Coventry plant was that brilliant motor engineer L. H. Pomeroy, who died in 1941. Before very long these two centres, together with Accuracy Works and a number of "shadow" factories, were working to the limit of their resources. Among the aircraft to which Hobson equipment was fitted were the Anson, Beaufighter, Beaufort, Blenheim, Halifax, Hampden, Lancaster, Spitfire, Stirling, Sunderland, Swordfish, Tempest, Wellington and Whitley.

Quite early during the war period Hobsons became interested in the fuel-injection system which the R.A.E. was developing, and by 1941 the firm was supplying carburetters working on this principle for the Napier Sabre. The Hobson-R.A.E. injection carburetter was further developed for the Bristol Hercules, and it was not very long before the system began to replace float-type carburetters for all engines of over 300 h.p. Its advantages are, of course, now well known: they include more-positive metering, immunity from negative-g effects, reduced liability to icing, and improved full-throttle performance at altitude.

And so the story moves on to these years of uneasy peace. By the end of 1946, when the company had reverted to the shorter title of H. M. Hobson, Ltd., its war factories at Bridgwater, Coventry, Oldham and Knighton (Wales) had closed down, and activities had been centralized in a works at Fordhouses, Wolverhampton, where an imposing new office block became the administrative headquarters. Even so, the manufacturing potential of the old Accuracy Works could not be absorbed, so in 1951 work was started on a 136,000 sq ft extension, which was completed last summer.

There, today, the firm is busily engaged on a range of products which, so far as aircraft are concerned, include not only carburetters, engine and flap control systems, fuel-injection pumps and various gas-turbine accessories, but also certain important contributions to a field of development offering almost unlimited possibilities for

In 1910, as this reproduction of a "Flight" front cover shows, Hobson's were advertising not carburetters (their principal product) but aeroplanes. The Roger Sommer biplane was described by us as "one of the most successful flyers of the day."

design and manufacturing ingenuity—that of powered flying-controls.

Mr. Stanley Hughes—the junior clerk of 1903—is now chairman and managing director, having succeeded Maj. Searight when the latter, who still serves in an advisory capacity, retired in 1951. The other members of the board are Mr. Hugh Burroughes, F.R.Ae.S. (president of the S.B.A.C., 1952-3); Mr. Thomas Simpson, A.F.R.Ae.S. (assistant managing director); Mr. P. H. Stokes, B.Sc., A.F.R.Ae.S. (technical director); Mr. A. J. Aiers, M.I.Mech.E., M.I.Prod.E., M.S.A.E.; Mr. Claude Clifford; and Mr. N. V. Dams.

HAWKER SIDDELEY PROGRESS

—in a Wide Field of Activity: Mr. T. O. M. Sopwith's Report

EVERYBODY who knows anything about British aviation is aware that the Hawker Siddeley Group is a very large and very efficient manufacturing organization: just how large, and how efficient, it is difficult for the outsider to visualize. But the facts and figures presented at the group's annual general meeting in London last week by the chairman, Mr. T. O. M. Sopwith, C.B.E., Hon.F.R.Ae.S., serve to bring the vast picture into focus; and the digest of Mr. Sopwith's remarks which we give here forms a useful guide to current Hawker Siddeley activities—though, of course, it omits mention of such varied enterprises as the manufacture of automobiles and pre-fabricated houses, which are outside our province.

In his general survey the chairman said that the group had been able to make a considerable contribution to the growing air strength of the British Commonwealth and her allies, no fewer than five of its designs having been selected for super-priority production. "In addition," he said, "we are engaged on orders for other types of great importance."

After paying a tribute to the design-teams responsible, Mr. Sopwith went on to analyse the factors underlying success in design. Such success, he said, was obtained by harnessing experience to forward thinking and planning.

"A factor of paramount importance," he continued, "is research. So rapid and continuous have been the advances in the science of aeronautics during the last few years that once again we are on the fringe of the unknown, venturing into realms about which there is little certain knowledge. The only way to obtain such knowledge is by research. The super-priority products I have referred to are the fruits of unceasing research work over the past decade."

After speaking of the necessity of retaining skilled workers in the aircraft industry in order to achieve stability, Mr. Sopwith went on to say that stability was necessary in order to attract men with the proper academic and technical qualifications: "If we are to keep the lead which we believe the British aircraft industry has established over other countries, we must continue to offer a worthwhile career to men of the right calibre."

He next turned to a review of current aircraft-types produced by members of the group. The super-priority Avro Vulcan was the first delta-wing bomber—and, they believed, the most efficient bomber—in the world. The design was quite revolutionary and had been described as "one of the most courageous pieces of development ever undertaken." The company hoped that they would ultimately be able to offer it, apart from its military rôle, as a large long-range passenger-carrying aircraft.

In addition to the Vulcan, the Avro organization had produced and put into service a new and improved version of the Shackleton—the Mark 2, representing an advance in endurance, armament, and load-carrying capacity. It combined all that was latest and best in submarine hunting and destroying.

One more highlight of the year was the first public demonstration of another delta, the super-priority Gloster Javelin all-weather fighter, which carried a large amount of the latest electronic navigational and combat devices to permit effective detection of a marauder flying at high speed and great height.

The Hawker Hunter, said Mr. Sopwith, had now been flown by numerous R.A.F. and American pilots, and all their reports had been most encouraging. Many flights had been made at supersonic speeds. In November, a version of the Hunter powered with the Armstrong Siddeley Sapphire flew for the first time, the extra power adding considerably to the already outstanding performance.

Deliveries of the Hawker Sea Hawk were shortly to be made to the Royal Navy and would continue in increasing numbers.

Armstrong Whitworth Aircraft were engaged on the A.W. Meteor N.F.11 night fighter, and both aircraft and spares deliveries were up to programme. Sales to France and Denmark had been negotiated and there was every possibility of further export sales during the coming year. Other important products were being made by this company, which would also bring into service, early

this year, a transonic wind tunnel, to be followed at the end of the year by one of the largest supersonic tunnels in the country sponsored by private enterprise.

At A. V. Roe Canada production of the C.F.100 all-weather long-range fighter was increasing steadily. This aircraft, fitted with gas turbines made by the same company, was in R.C.A.F service, and recently a new and improved version flew at supersonic speed for the first time.

Turning to engines, Mr. Sopwith said that Armstrong Siddeley Motors were engaged on two super-priority engines, the Sapphire and the Double Mamba. The power of the Sapphire had steadily increased, and it was still the most powerful type-tested jet engine in the world. It was being made for the Javelin, Hunter and Handley Page H.P.80, and was being built under licence by two American companies. The Double Mamba was in production for the Navy's latest anti-submarine aircraft. The companies concerned were keeping faithfully to the schedules laid down by the M.o.S. In Canada, also, engine production was well up to schedule—in this case of the Orenda turbojet.

After referring to "other engines, including rocket motors, under development for future aircraft applications," Mr. Sopwith made guarded reference to activities in the guided-weapons field, saying that steady progress had been made and that management and technical teams had gone to Australia with a view to extending activities to that continent.

He went on to say that High Duty Alloys, Ltd., were continuing to work at pressure on the production of high-strength aluminium forgings, stampings and extrusions, and that a new 12,500-ton press would shortly be in operation at the Redditch works. The company had also increased the capacity of some of its factories for the production of compressor and turbine blades.

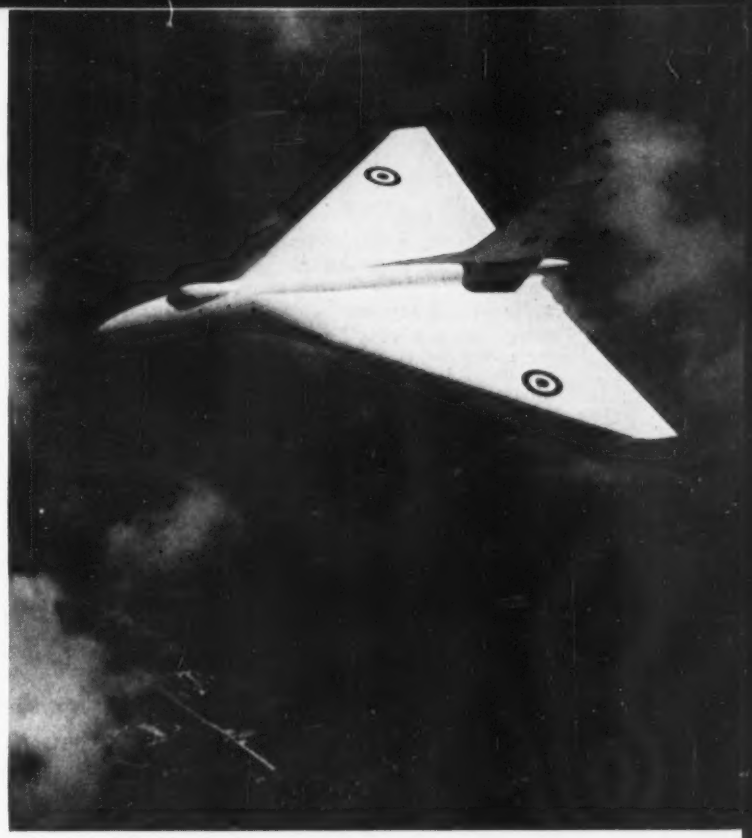
Turning to the progress of Air Training, Ltd., Mr. Sopwith said that a large sum had been spent on re-equipping the aircraft fleet, so that the school was now the first in Europe to be able to train *ab initio* students to a standard which would fit them for immediate employment with airlines. He then went on to speak of A.S.T.'s venture into the field of general education: as we have already reported, the company is to establish in Pakistan two schools, of public-school type, which will prepare boys not only for the R.P.A.F., but for the Army, Navy, or Civil Service.

The aircraft division of Air Service Training had had another successful year and was undertaking a great deal of work for other companies in the Hawker Siddeley Group.

Reverting to aircraft and engine production, the chairman discussed overseas trade possibilities, saying that during the past year the group had exported its products to France, Holland, Belgium, Denmark and Iraq, and there was every prospect that, once R.A.F. needs had been met, many of the present super-priority products could be exported to NATO countries.

Earlier in his speech, the chairman had commented on the financial report and accounts, which had been previously circulated. He said that high taxation made it increasingly difficult for industry to finance current trading. In cases of companies with Government contracts, the absurd position often arose where one Government department demanded heavy tax payments whilst another found it difficult to finance stock and work-in-progress, thus throwing an additional burden on the contractor.

Trading profits of the company and its subsidiaries for the year ended July 31st, 1952, after deducting reserve for increased replacement-cost of fixed assets, amounted to £5,184,522, as compared with £4,216,835 for the previous year. Taxation, based on the preceding year's profits, was estimated at £3,768,563.



"The super-priority Avro Vulcan," said Hawker Siddeley's chairman, "is the first delta-wing bomber—and, we believe, the most efficient bomber—in the world. The design is quite revolutionary . . ."

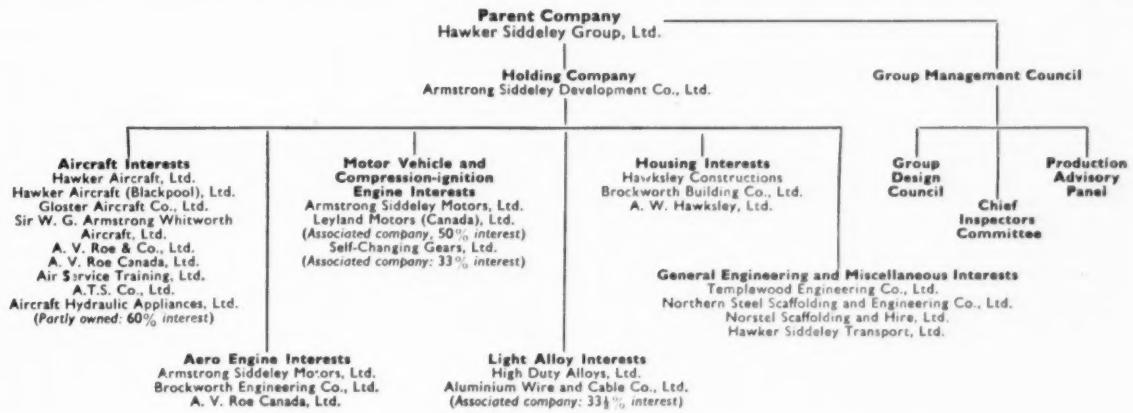
After including profits of prior years, less taxation, the balance of profit was £2,051,478. A sum of £500,000 had again been transferred to contingency reserves and the amounts carried forward on the profit-and-loss accounts of the subsidiaries had been increased by £1,119,983. Of this £406,954 related to A. V. Roe Canada, Ltd. The resultant balance of profit of Hawker Siddeley Group, Ltd., was £431,495, which covered the dividends and increased its carry-forward by £73,322.

Mr. Sopwith concluded his report by making "a brief reference to a topic that has been in the news recently—the Labour Party's threat to nationalize the aircraft industry at some future date." He said:—

"There are three things that have brought the industry to its present peak of achievement: courage, enterprise and enthusiasm. Let me assure you—and I say this most solemnly—that there is *one* thing which would wreck this virile, progressive industry surely and completely. That one thing is nationalization.

"Nationalization inevitably means mediocrity. *And mediocrity means the downfall of the British aircraft industry, the downfall of Britain as a first-class air power.*"

BIG-FAMILY TREE: HOW THE HAWKER-SIDDELEY INTERESTS ARE INTEGRATED


Parent Company
Hawker Siddeley Group, Ltd.
Holding Company
Armstrong Siddeley Development Co., Ltd.
Group Management Council
Aircraft Interests
Hawker Aircraft, Ltd.
Hawker Aircraft (Blackpool), Ltd.
Gloster Aircraft Co., Ltd.
Sir W. G. Armstrong Whitworth Aircraft, Ltd.
A. V. Roe & Co., Ltd.
A. V. Roe Canada, Ltd.
Air Service Training, Ltd.
A.T.S. Co., Ltd.
Aircraft Hydraulic Appliances, Ltd.
(Partly owned: 60% interest)
Motor Vehicle and Compression-ignition Engine Interests
Armstrong Siddeley Motors, Ltd.
Leyland Motors (Canada), Ltd.
(Associated company, 50% interest)
Self-Changing Gears, Ltd.
(Associated company: 33⅓% interest)
Housing Interests
Hawksley Constructions
Brockworth Building Co., Ltd.
A. W. Hawksley, Ltd.
Group Design Council
Chief Inspectors Committee
Production Advisory Panel
General Engineering and Miscellaneous Interests
Templewood Engineering Co., Ltd.
Northern Steel Scaffolding and Engineering Co., Ltd.
Norstel Scaffolding and Hire, Ltd.
Hawker Siddeley Transport, Ltd.
Aero Engine Interests
Armstrong Siddeley Motors, Ltd.
Brockworth Engineering Co., Ltd.
A. V. Roe Canada, Ltd.
Light Alloy Interests
High Duty Alloys, Ltd.
Aluminium Wire and Cable Co., Ltd.
(Associated company: 33⅓% interest)

CORRESPONDENCE

The Editor of "Flight" does not hold himself responsible for the views expressed by correspondents in these columns; the names and addresses of the writers, not necessarily for publication, must in all cases accompany letters.

Flying Over Mountains

THE very interesting article by Mr. A. H. Yates in *Flight* for January 2nd, on "Airflow over Mountains," shows a considerable danger to aircraft from down-currents when there is a strong wind. There is, however, the possibility of added danger from winds over mountains causing regions of reduced atmospheric pressure, which makes altimeters in aircraft read too high. Winds of 100 m.p.h. are not infrequent over the tops of the hills and mountains in the British Isles.

In a progress report from the U.S. Department of Commerce Weather Bureau, in December 1947, Mr. L. P. Harrison said that in an 100 m.p.h. wind at Mt. Washington they measured altimeter errors of 370ft, due to change of stagnation-pressure, but that this might have been increased by various other causes such as distortion of cyclonic pattern, changes of energy by friction, etc., which might bring the total error up to 1,250ft, plus a further error if the temperature gradient near the mountain was different from that used in the calibration of the altimeter. In *Mountain Winds and their Effects on Flight*, a paper issued by the Bureau of Safety Investigation, C.A.B., a case was reported of an altimeter reading 3,000ft higher than the actual altitude.

The report on the Aer Lingus accident shows that the aircraft gave its height as 6,500ft within three minutes of the accident. As civil aircraft usually change height slowly, it is probable that the altimeter was reading little less when the aircraft was caught in the down-currents. If, however, the real altitude was considerably less than this, due to the errors suggested, the danger of down-currents would have been much increased. Is there not a possibility that this error might in some cases have caused collison with mountains? The possibility of these errors never seems to have been fully investigated and it would be very interesting to know whether any British pilots have observed them.

Ministry of Supply, K. W. CLARK.
London, W.C.2. Assistant Director,
for Director of Civil Aircraft Research and Development.

The "Redundant" Instructors

THE young men of Britain have in the last few months had their attention drawn to the need for the birth of a new spirit of adventure and enterprise in every walk of life. A special call went out to young men to begin a Second Elizabethan Era by establishing British supremacy in the air both commercially and militarily, just as the First Elizabethan Era was born of skill and initiative at sea.

Every day comes fresh evidence that the young men of Britain —the young in heart and the young in years—are answering that call in the field of aircraft design and manufacture. Inch-high front-page headlines tell only too well of the British lead in this field; and the masses of the people say "How wonderful : how fine and dandy. We are in front, years in front, and never again will be caught unprepared as we were in 1939."

In smaller type on an inside page a headline tells of the closing of civilian-operated flying-training establishments. The masses of the people do not read this; and if they read the small paragraph they do not comprehend the danger. They do not know of the small band of 250 flying instructors who will this year be set aside as worthless; or if they do know, they will dismiss it with possibly a vague comment about some slight redundancy in aircraft industry.

To establish and maintain British air supremacy it is not enough to design and make the best machines. We must have the best pilots to fly them as well. In the military field the R.A.F. selects the pilot material for training; so far, because of that selection (in many cases, in spite of it) these 250 flying instructors have turned out good basically trained pilots from that material, ready to learn to use an aircraft as a weapon and later, after R.A.F. service, to become pilots in the commercial field.

Who are these civilian flying instructors? What manner of men are they? These men trained pilots for the bombing of Berlin and the Ruhr, for our air supremacy on D-day, for the shooting down of "buzz bombs" and for operations against Japan after the European struggle was over. Most of them know operational flying, too, with its grimness and terror and the need for courage and quick decision. They have a wealth of experience and knowledge which no instructor trained since the war can possibly have until another war is upon us. Flying hours they count in thousands. They are young in heart and fairly young in years, yet old enough to instil confidence, respect and discipline into the youthful pilot trainee of today. Most of these instructors, carefully vetted by R.A.F. examiners at regular intervals, have qualified to R.A.F. standards in the past year by hard study in spare time after the day's work is done. All are members of the Volunteer Reserve or attached to Auxiliary Squadrons—many have been members since the reforming of these forces in 1947. A number gave up good, secure, pensionable work in 1951-52 to devote themselves to training Britain's pilots.

Now, after a brief 12 months, they are faced with unemployment, and no prospect of further achievement in their profession in this country. They are told that the reason is national economy; but how can economy be achieved by closing the civilian schools when so much more will have to be spent in expanding the R.A.F. training establishments? They know that pilots will still be needed this year, and in the years to come, to fly the wonderful machines now being made. How much will be lost to Britain in the throwing-aside of so much experience and quality?

These 250 men of Britain have pride in their jobs and will continue to give of their best for many years if given the opportunity. They believe, with ample justification, that they are the cream of basic flying instructors in this country today. They also have pride in themselves, and if thrown aside now they will not answer the call a second time, when the need for their services will surely come.

Burnaston, Derby. FRANCIS G. SPENCER.
(On behalf of the flying instructors of No. 3 B.F.T.S., Derby.)

F.E.2s, "Brisfits" and B.A.T.s

THE letters from A.Cdre. Sir Vernon Brown and Mr. C. Brown, which appeared in *Flight* of January 2nd, are remarkable not only because they both obviously refer to the same action, namely, the destruction of the Zeppelin L.48, but also because both ascribe the L.48's defeat to an F.E. 2B. Yet both thereby contradict recorded history.

The end of the L.48 is described on page 33 of Vol. V of *The War in the Air* (the official history) in this way :—

> "At 3.28 a.m. at Theberton, north-east of Saxmundham, she met her end. She was attacked simultaneously by Captain R. H. M. S. Saundby, Royal Flying Corps, in a D.H.2 of the Orfordness Experimental Station, and by Lieutenant L. P. Watkins, Canadian Army attached to No. 37 Home Defence Squadron, in a B.E.12. The final blow was delivered by the latter officer and the L.48, in flames, descended slowly into a field at Holly Tree Farm."

A footnote to the page quotes Watkins' report, which starts : "On the morning of the 17th June, 1917, I was told by Major Hargrave there was a Zeppelin in the vicinity of Harwich, and was ordered to go up on B.E.12 6610."

The same action is described by Capt. Joseph Morris in his book, *The German Air Raids on Great Britain*, 1914-18, in the following terms :—

> "Second Lieutenant L. P. Watkins of No. 37 Squadron, who went up from Goldhanger just after two o'clock in the morning, was at a height of about 11,000 feet over Harwich when he 'saw the A.A. guns firing and several searchlights pointing towards the same spot.' Almost at once he sighted the L.48 about 2,000 feet above him. He immediately climbed towards her, firing two drums in succession into her tail without effect. Having now reached 13,200 feet he was still some 500 feet below the L.48. Three short bursts were followed by the remainder of the drum and 'the Zeppelin burst into flames at the tail.' The L.48 fell flaming into a field at Holly Tree Farm near Theberton. Captain R. H. M. S. Saundby, of the Experimental Station at Orfordness, had engaged the airship about the same time."

In the Appendix (p. 278) to his book, Capt. Morris gives Watkins' machine as a B.E.12.

It can be seen that both authorities agree that the L.48's conqueror was 2nd Lt. L. P. Watkins, not Lt. Holder, and that the aeroplane was a B.E.12, No. 6610, not an F.E.2B. In view of the fact that Watkins was at 13,200 feet, it seems unlikely that he was flying an F.E.2B, with its service ceiling of only 11,000 ft (160 h.p. version). The service ceiling of the B.E.12 was about 12,500ft, which seems more reasonable.

The extraordinary thing is that two quite independent people should provide an essentially similar story, which yet conflicts with the official record.

The serial number B.401 quoted by Mr. C. Brown would be quite acceptable as an F. E. serial, and his letter is of additional interest in providing the name of a further firm of sub-contractors.

The B.A.T. machine mentioned by Mr. P. M. H. Lewis was undoubtedly one of the Bantams, and almost certainly the one which bore the early civil registration K.123. At the time Mr. Lewis saw it, it belonged to Mr. C. P. B. Ogilvie, and now reposes, sadly dilapidated, at Old Warden. Quite a number of Bantams were built : known British serial numbers are B.9945, B.9947,

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CORRESPONDENCE . . .

F.1653, and F.1655 to F.1661. What is not so well known is that at least one Bantam went to America, where it wore full American insignia (the white star on blue ground with the red centre spot), and had the American number AS94111 plus the Wright Field Project No. P.167 on the rudder.

Finally, to take up S/L. Doran-Webb's point (*Flight*, December 26th), I have always been under the impression that the Bristol Fighter was known as the Brisfit, during the 1914-18 War at least, because that was the signals contraction of its name. I know that Nos. 48 and 67 Squadrons usually called their Bristol Fighters "Bifs," and I believe they were known as "Boats" in No. 39 Sqn. Perhaps by the time when S/L. Doran-Webb made the Bristol's acquaintance the wartime signals contraction was no longer in use.

I should certainly deprecate the use and perpetuation of erroneous nicknames for any aeroplane, but I do think that any contemporary soubriquets should be recorded, whether euphonious or not. After all, whether we like it or not, one of the names gives to the D.H.6 by at least a part of the flying fraternity of its day was "The Dung-hunter."

Birmingham, 32. J. M. BRUCE.

MY sincere congratulations to Mr. J. M. Bruce, on his series of historic-aircraft articles currently running in *Flight*. Regarding S/L. Doran-Webb's recent letter, I would like to point out that the name "Brisfit" applied to the Bristol Fighter, is far from being a "modern tendency." Owners of copies of the magazine *Popular Flying* will find frequent references to the "Brisfit" by men who flew and fought in them.

The late Eddie Riding, and Mr. Owen Thetford, both well known for their research into aviation during the 1914-1918 War, frequently used the word "Brisfit." I think these examples should prove that there is nothing modern about the term.

R.A.F., Topcliffe. F. A. YEOMAN, P/O.

PERHAPS the following may be of some help to Mr. P. M. H. Lewis (Correspondence, *Flight*, January 2nd) in identifying his elusive B.A.T. It is taken from an article by the late Eddie Riding, describing the B.A.T. FK23 Bantam and published in the March, 1948, *Aeromodeller* :—

> ". . . After twenty-seven years of retirement, all that remains of K.123 can be seen at Primrose Garages, on the Radlett Road, near Watford, Herts.
>
> "Mr. C. P. B. Ogilvie, who bought both K.123 and F.1661 in 1920, has assembled the former and hired it out to local cinemas on occasions when they have shown World War I flying films. It still carries the white patch on which the racing number 1 was painted for the Aerial Derby, and also the registration letters K.123 in black outlined with white on the top surface of the starboard upper plane. The other machine, F.1661, was bought by Koolhoven in 1924 and taken back to Holland . . ."

There would, however, appear to be a slight difference in the markings observed by your correspondent, and it may be a case of his getting his memory and photographs mixed. Then again, it could be another aircraft floating around.

Leeds, 10. B. GOMERSALL.

"Dinghies of the Air"

FURTHER to my plea for a light aeroplane, or "dinghy of the air," W/C. Brie's letter (November 21st), regarding the comparative ease of piloting an Autogiro, reminds me of that intriguing little single-seater two-bladed Autogiro I watched flying during its development at Hanworth in the middle-1930s. Perhaps Mr. Brie would tell us why this little machine failed to reach the public. Was there some aerodynamical snag discovered, or did the production cost of rotor-starting gear prove too costly? Although it was not what I had in mind for a dinghy of the air, a small autorotating-wing-type craft might provide one answer, for whereas the helicopter is too expensive and difficult to fly at short notice, the Autogiro is virtually stall-proof—a mug can fly it—and it can get in and out of small areas. One can see every blade of grass as one lands, which is exactly what we want. Why has the type been dropped for private flying? Is it because there is no private ownership to speak of?

Turning to the other recent letters in reply to mine, let us hope there is some motor-cycle manufacturer who has the enterprise to set aside one or two engines in the interest of experimental progress. The old spirit of adventure cannot have died in the motor-cycle industry—the spirit which helped A. V. Roe to make a start, and the Lympne Trials to function.

Mr. Creedon (December 19th) puts his finger bang on the greatest obstacle to the production of a cheap little aircraft to suit the equivalent of the dinghy sailor. The unimaginative "Man in the Ministry," waving his ridiculous little red flag, successfully prevents the development of popular personal aircraft (which he is supposed to promote) by the most costly and impenetrable forest of regulations he can devise. Presumably he imagines he is saving us from the ghastly menace of one or two popbottle aircraft crashing at 30 or 40 m.p.h. on a lonely field with a cow as a witness, whilst he waves on giant airliners and jet aircraft heavily loaded with hundreds of gallons of fuel hurtling through murky weather to their landing fields, over the outskirts of great cities teeming with life.

The odd thing is that we taxpayers continue to pay this "Man in the Ministry" to guard against the possibility of private-owner flying in our lifetime. Now that we again officially believe in developing private ownership in houses, perhaps the new Government might be persuaded to encourage private-owner flying and so create airmindedness against national emergencies—recollecting the dinghy sailors who were so useful at Dunkirk and afterwards.

In the early days of flying, aeroplanes lightly loaded flew slowly, and very few people were killed in the streets by crashing craft, in spite of engines that failed regularly, and airframes that sometimes failed. With modern knowledge and powerplants, the danger from slow-flying aircraft is just about nil. They would be a whole heap safer than the youths who hurtle along busy, greasy roads, on "100 m.p.h." motor-cycles armed only with an "L" plate and a third-party insurance.

Sandbanks, Bournemouth. C. E. BOWDEN.

Who Knows of a 504?

MANY of your readers will well remember my father, the late Captain P. Phillips, of St. Austell, Cornwall, and the red Avro 504Ks owned by Cornwall Aviation Co., Ltd., with which he initiated so many of the south coast holiday-makers to the joys of flying.

He was almost continually associated with the Avro 504, first with the barnstorming days of the "twenties," and later (with the radial Armstrong Lynx engine and designated the 504N) at Sir Alan Cobham's circuses, and with aerial advertising in Air Publicity, Ltd., until his untimely death in 1938.

Following in his footsteps, I am employed as a pilot with one of our leading charter companies, but I am very interested in club flying and instructing whenever I have the opportunity of taking a "busman's holiday," and it is one of my highest ambitions to fly one of the aircraft in which my father totalled so many thousands of hours.

I wonder if any of your readers could tell me if there is a serviceable Avro 504K or 504N in the country, which I might be given the opportunity of flying for a few circuits?

Bishops Stortford. D. W. PHILLIPS.

[Capt. Phillips' full address is 8 Chantry Close, Bishops Stortford, Herts.—ED.]

FORTHCOMING EVENTS

Jan. 16. Institute of Navigation: "Radar and Ice," by L. S. Le Page and A. L. P. Milwright.
Jan. 17. Aircraft Recognition Society: Sixth All-England Recognition Contest.
Jan. 17. British Interplanetary Society (Manchester): "Cosmic Radiation, Intensity and Biological Effects." Dr. L. R. Shepherd.
Jan. 17. British Interplanetary Society (Yorkshire): "The Exploration of Space," by A. C. Clarke, B.Sc., F.R.A.S.
Jan. 22. R.Ae.C.: Talk by William Courtenay, O.B.E., M.M.: "The Pacific Islands Campaign."
Jan. 22. Institute of Welding (N. London Branch): "Joining of Aluminium and its Alloys," by W. V. Binstead, M.I.M., A.M.Inst.W.
Jan. 27. Plymouth Aircraft Recognition Society: Meeting.
Jan. 27. R.Ae.S. Graduates' and Students' Section: "A Physical Interpretation of Supersonic Flow," by R. Stanton Jones, M.A., D.C.Ae., Grad.R.Ae.S.
Jan. 28. R.Ae.C.: British Air Racing Championship Dinner.
Jan. 29. R.Ae.S.: "Titanium," by Maj. P. Litherland Teed, F.R.Ae.S., M.Inst.Met., M.I.M.M.
Jan. 29. R.Ae.C.: Film: "Colour Movies of the Pacific War," by William Courtenay, O.B.E., M.M.
Jan. 30. Junior Institution of Engineers: "Metal Spinning," by R. R. Baskerville.
Jan. 31. S.L.A.E. (London): Lecture (to be announced).
Jan. 31. Closing date for England-Christchurch (N.Z.) Race Entries.
Feb. 7. Helicopter Association: Discussion on Standards of Maintenance, and Requirements for Helicopter Engineers' Licences. Papers by Members of the A.R.B. and S.L.A.E.
Feb. 7. British Interplanetary Society: "Limiting Performance of Rocket Motors," by W. N. Neat, B.A., A.F.R.Ae.S.
Feb. 9. Institute of Transport: Brancker Memorial Lecture: "The Influence of Military Aviation on Civil Air Transport," by Sir Frederick Handley Page, C.B.E.
Feb. 11. British Institution of Radio Engineers: "Modern Trends in Communications Materials," by L. A. Thomas, B.Sc.
Feb. 11. R.Ae.S. Graduates' and Students' Section: "Production of Prototype Aircraft," by W. Thorn.
Feb. 12. R.Ae.S. Section Lecture: "Integral Construction and its Effect on Production Methods," by E. Dixie Keen, B.Sc.(Eng.).
Feb. 14. British Interplanetary Society (Birmingham): "Rocket Test-bed Instrumentation," by J. Venn, B.Sc.
Feb. 17. R.Ae.S. Section Lecture: "Recent Developments in Gliding," by A. H. Yates, B.Sc.(Hons.), A.F.R.Ae.S.
Feb. 18. Aircraft Recognition Society: Meeting: Guest Speaker, Peter G. Masefield, M.A.(Eng.), F.R.Ae.S.

THE INDUSTRY

New Radar Tubes

THE progress of radar in recent years has been so great that, for many applications, further development of the tubes which display the information obtained has become desirable. Mullard, Ltd., of Century House, Shaftesbury Avenue, London, W.C.2, have recently introduced a new range of such tubes. Flat faces coated with metal-backed magnesium fluoride are employed, resulting in an orange-coloured display of unusually long persistence.

Resolution, contrast and brilliance are claimed to be excellent, and the units are designed to stand up to the arduous conditions that are inseparable from so many modern installations. Included in the range are a 5-inch tube (MF 13-1) especially suitable for airborne and small marine use, a 12-inch (MW 31-55), and a 16-inch (MF 41-15); this last-named type is designed for airport, harbour and other large displays.

Progress in Instrument-Testing Equipment

EQUIPMENT for the testing of Mach meters is shortly to be added to the range of instrument-testing apparatus manufactured by Bryan's Aeroquipment, Ltd., Willow Lane, Mitcham, Surrey. Also, as a result of collaboration with Normalair, Ltd., equipment will be available for testing the cabin-pressurization equipment and the latest type of oxygen-demand apparatus made by the latter company.

Bryans state that, in order to facilitate production and marketing of their increasingly wide range of equipment, a certain degree of internal reorganization has been found desirable and two special directors have been appointed. Mr. A. V. Lawton, previously commercial and general manager, who has been with the company since 1940, becomes sales director. Mr. H. D. Strawson, C.B.E., A.F.R.Ae.S., becomes production director: until recently, he was chief engineer (operations) to B.O.A.C.

The board of directors comprises Mr. S. J. Gordon (chairman), Mr. M. C. Bryans, Mr. J. R. Bryans (managing), G/C. P. W. S. Bulman, C.B.E., M.C., A.F.C., F.R.Ae.S., Mr. J. V. Holman, A.F.R.Ae.S., M.I.Ae.S., and Mr. C. E. Stearns, O.B.E. The chief designer is Mr. Jack Austin, A.R.Ae.S., and acting as a consultant is Mr. J. A. Nye, F.Inst.P., late of the Directorate of Research and Development, Ministry of Supply.

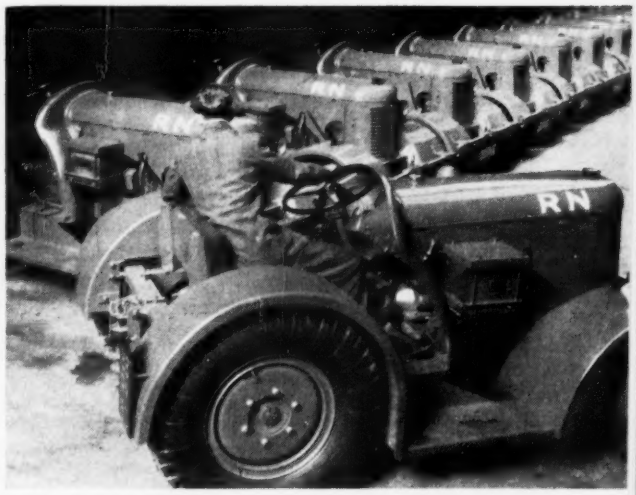
Radar Reflections

IT is announced that G/C. S. Lugg, C.B.E., M.(Brit.) I.R.E., A.M.I.E.E., has joined Suchy Holdings, Ltd., of 62/4 Temple Chambers, Temple Avenue, London E.C.4, as executive director in charge of technical research and development: he also becomes a director of the company's three subsidiaries.

G/C. Lugg was chief radar officer to General Eisenhower in North Africa and in Normandy, and was twice awarded the American Legion of Merit; he was mentioned in dispatches, and was made C.B.E. in recognition of his work there and in Germany with the 2nd T.A.F. Before retiring, at his own request, he was for three years Deputy Director of Radio Engineering (Air) at the Air Ministry; his flying career in the Royal Air Force was also distinguished.

Mr. C. T. Suchy is chairman of Suchy Holdings, Ltd., of which the subsidiary companies are Chemring, Ltd., the Dowsing Co. (Electrical Manufacturers), Ltd., and the British, Foreign and Colonial Automatic Light Controlling Co., Ltd.

The last-named company make time-switches and other light engineering products, whilst the Dowsing Co. manufacture electrical heating apparatus and (more recently) protective and electrically heated clothing. Chemring, Ltd., are specialists in high-conductivity metal fabrics. Their Sucal radar fabric is intended for radar-reflecting parachute canopies and similar applications, whereas the much lighter Sucal radar mesh is used for radar flags on buoys, "corner" reflectors beneath high-altitude meteorological balloons, expanding covers for small (and therefore economical) medium-altitude balloons, and banner targets for gunnery training. Provided the mesh is sufficiently fine these materials are claimed to be over 90 per cent efficient in reflecting radar waves as compared to any continuous surface, yet weigh 95 per cent less. They also reduce wind resistance.



PULLING TOGETHER: Thirty-five of these David Brown Taskmaster tractors have been ordered on behalf of NATO by the United States Navy for use by British Naval aviation, under the off-shore contract scheme. Payment will be in dollars, and the tractors will be used both on aircraft carriers and at Naval establishments ashore.

IN BRIEF

Mr. Andrew Blyth, general manager of William Mills, Ltd., Wednesbury, Staffs, has been appointed to the company's board.

* * *

British Insulated Callender's Cables, Ltd., announce the appointment of two branch managers to succeed Mr. R. S. Gough (Bristol) and Mr. T. R. Thomas (Cardiff), who have both retired; they are, respectively, Mr. T. L. Purves and Mr. L. R. Greet.

* * *

Among new British Standards recently issued is B.S.740, Pt.2, 1952—*Portable Fire-extinguishers of the Foam Type (Gas Pressure)*. Copies are obtainable, price 6s, from the British Standards Institution, 24 Victoria Street, London S.W.1.

* * *

Smiths instruments fitted to the Marcel Dassault Mystère 2 which recently flew at supersonic speed included engine-speed and jet-temperature indicators, the new Mk XII electric turn-and-slip indicator, and the altimeter. All this equipment was of normal production type.

* * *

The third Summer School of Welding organized by the British Welding Research Association will be held at Ashorne Hill, near Leamington Spa, from April 27th to May 2nd. The general theme of the course will be welding fabrication and production, and there will also be specialized lectures applicable to particular industries, among which is the aircraft industry. Early application should be made to The Secretary, British Welding Research Association, 29, Park Crescent, London, W.1.

"A sharp rise in orders" for gas-turbine test plant is mentioned in the chairman's report circulated to shareholders of Heenan and Froude, Ltd., Worcester, in connection with the recent annual general meeting. Mention is also made of "a new type of dynamometer capable of absorbing very high powers at extreme speeds."

* * *

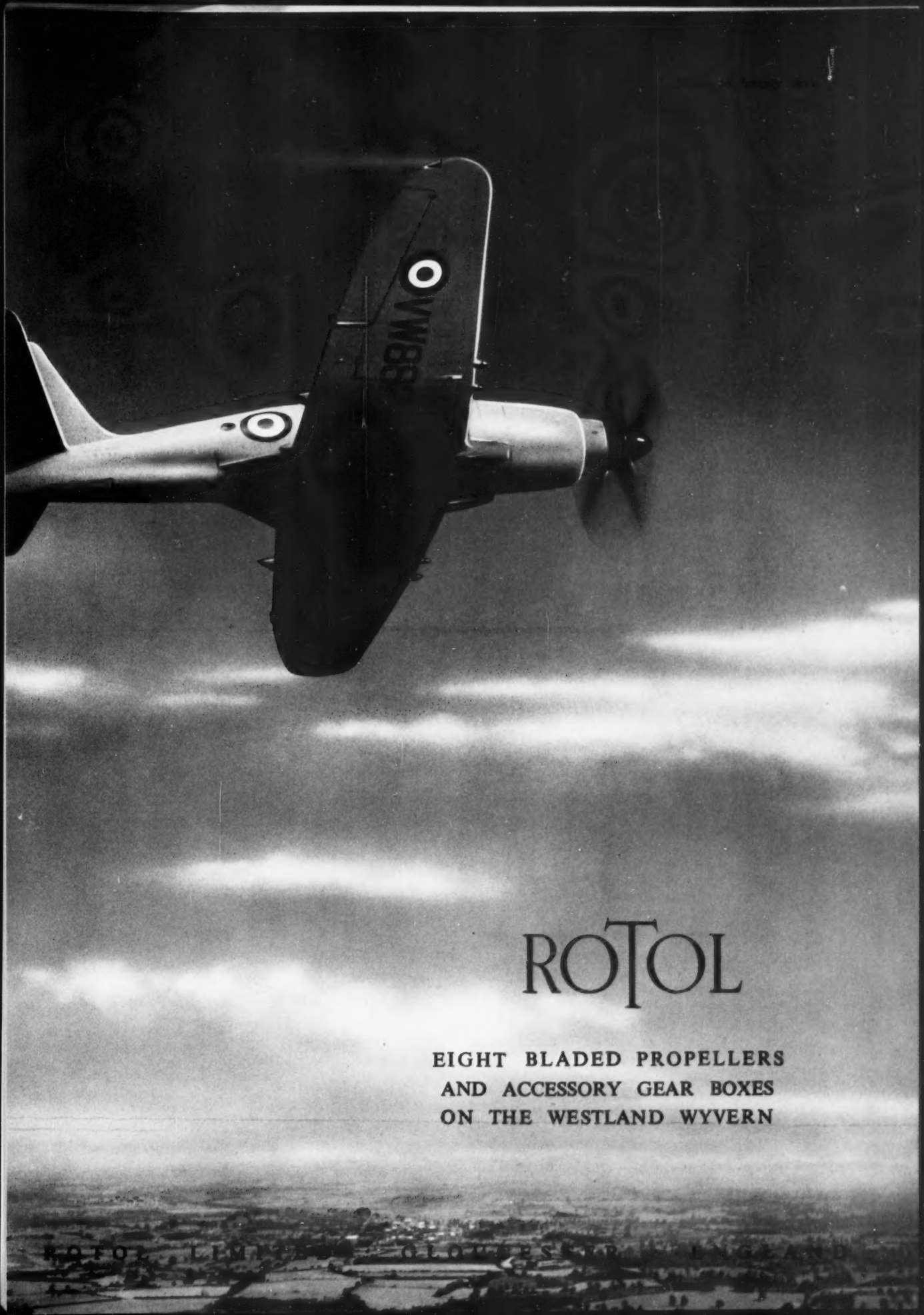
G/C. Christopher Clarkson, A.F.C., A.F.R.Ae.S., A.F.I.Ae.S.—who, as recorded in our issue of November 7th last—is acting as North America technical consultant for B.E.A. and several aircraft firms—now has a new office address in New York: Room 917, 342, Madison Avenue, New York, 17 (Murray Hill 2-2618).

* * *

In accordance with his statement at the company's last annual general meeting, Mr. R. W. Cooper, M.C., chairman of the British Aluminium Co., Ltd., has resigned his directorship as at December 31st, 1952. Another director, Viscount Portal of Hungerford, K.G., G.C.B., O.M., D.S.O., M.C., succeeds him as chairman. Also appointed a director is Mr. E. F. O. Gascoigne.

* * *

Elliott Brothers (London), Ltd., manufacturers of electrical, electronic and process-control instruments, announce the transfer of their Birmingham branch office to larger and more modern premises at 181, Corporation Street, Birmingham, 4 (Central 8313). Process-control interests are in the hands of Mr. A. H. Robinson and Mr. H. F. Johnson, while Mr. G. F. Thomas specializes in electrical measuring-instruments.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EIGHT BLADED PROPELLERS
AND ACCESSORY GEAR BOXES
ON THE WESTLAND WYVERN

a tight turn....

The skier's ability to make a tight turn on a fast down hill run may mean the difference between a race won or lost, or even life and death. . . . Tight turns at the high speeds required of modern aircraft, impose stresses upon them which can only be endured if the design and quality of their component parts is of the highest. The ultra light magnesium alloy components made by Essex Aero Ltd fully meet these requirements.

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CIVIL AVIATION

BRAZIL ORDERS COMETS

AFTER a long period of negotiation, the de Havilland Aircraft Co., Ltd., have announced yet another definite purchaser of Comets—Panair do Brasil, which has placed a firm order for four Series 2s (for delivery beginning in 1954), and has taken an option for two Series 3 machines for later delivery. Both versions of Comet as supplied to Panair will be powered by Rolls-Royce Avons. The Series 2s will be fitted out as 44-seaters capable of operating 2,000-mile stage-lengths with full capacity payload of over 13,000 lb; the Series 3s will probably be furnished as first-class mainliners for 58 passengers, though capable of conversion to a 78-passenger coach layout. Payload-range combinations for the Comet 3 have been provisionally given as 17,300 lb/2,600 miles (first-class) and 20,000 lb/2,400 miles (tourist).

As long ago as April 6th, 1951, Panair do Brasil announced in Rio de Janeiro a decision in principle to adopt the Comet for its main trunk services, including those which cross the Atlantic Ocean to Europe and the Middle East; and it was then believed that the Series 2 would suit the company's needs more satisfactorily than the Series 1, by reason of the long trans-ocean and continental stages. These include crossings of the Andes, which the Comets will traverse at twice the mountain heights.

The main Panair services at present operate once weekly in each direction between London and Buenos Aires, Beirut and Buenos Aires, Rio de Janeiro and Santiago, Frankfurt and Buenos Aires, and Rio de Janeiro and Buenos Aires. The company's fleet includes seven Model 049 Constellations, which carry 41 passengers on trans-ocean stages and 50 on the shorter sectors.

De Havilland state that: "Up to now 46 Comets of all series have been definitely ordered, in addition to more than 100 of the Series 2 and 3 now under active discussion, many of them in an advanced stage of contract negotiation." Details of most of the orders announced so far were published in *Flight* of January 2nd.

Certain newspapers have inferred that Panair would now become the first airline to operate jet services across the South Atlantic between Britain and South America. B.O.A.C. point out, however, that the first of the Corporation's Comet 2s will be delivered this year, enabling the British airline to pioneer jet travel to South America early in 1954. The Comet 2 would also be used to begin upper-air exploration over the North Atlantic preparatory to the opening of regular services with Comet 3s. This is the first official statement that Mk 2s will not be used on N. Atlantic services.

DANGEROUS AIRFLOW . . .

DISCUSSING the behaviour of airflow over mountains, with particular reference to the loss of an Aer Lingus Dakota a year ago, Mr. A. H. Yates pointed out in *Flight* recently (January 2nd) that "a safety height of 1,000ft above the mountain tops, which was until recently accepted even for much lower ground, is clearly inadequate in the light of present knowledge . . ." His belief is now endorsed by an M.C.A. Information Circular, Number 3/1953, which recommends pilots, in deciding the safety height for each section of a route, to take account of the "configuration of the terrain, the wind velocity, the cloud amounts at various levels and the practicability of keeping clear of icing levels, the meteorological advice given in the particular case and any past experience of the route in similar weather conditions."

The circular states that: "In unstable air, vertical currents associated with convection are liable to be more intense over mountains than over level terrain, especially in strong transverse air streams, but in these cases the distribution of vertical currents is irregular. With transverse streams of stable air, however, the disturbance of the airflow by a mountain range can set up an organized flow-pattern comprising waves and/or large-scale eddies in which strong vertical currents and turbulence can occur. These effects are sometimes manifest to a considerable height above the level of the crest and may persist for many miles downwind. Thus, whether the air be stable or unstable, mountains may give rise to strong vertical currents. It may be noted that the phenomena referred to have been observed even in moderate winds, an example being a down current of 800 ft/min experienced on the lee side of mountains 1,500ft high in transverse winds of only 20 kt. More pronounced effects can be expected in stronger winds, especially over higher ground with a precipitous lee slope."

. . . DANGEROUS EXHAUST

WARNING of another hazard underlined by a recent accident is contained in an A.R.B. notice to licensed engineers and owners of civil aircraft, which warns operators of Austers modified for the use of cameras, long-range belly tanks and similar fittings against the possibility of dangerous carbon monoxide concentrations in the cabin. An M.C.A. report found that this was the probable cause of the accident to a photographic Auster, resulting in the death of its pilot, as reported in *Flight* of January 9th. The A.R.B. is unable to prescribe any general corrective measures for camera installations already approved and therefore instructs operators to warn pilots to increase the ventilation if exhaust fumes are smelt. Before further camera modifications are approved, tests of the aircraft concerned must be made in varying conditions of flight, and no further aircraft may be modified in accordance with the already approved installations unless the modifications are checked by similar tests to the satisfaction of the A.R.B.

COMET CERTIFICATION TALKS

IT is announced that Mr. R. E. Hardingham, secretary of the Air Registration Board, will fly to Washington in a week's time to discuss with the American Civil Aeronautics Administration the question of certification of British gas-turbine powered aircraft in the United States. The main subject of the discussions, which will continue for about a fortnight, will be the possibility of American recognition for certificates of airworthiness issued for the various marks of Comet. The Comet cannot qualify for American certification since the C.A.A. has not drawn up any airworthiness requirements for turbine-powered aircraft, the American view being that "there is as yet insufficient data on jet transport operation to formulate a realistic policy on certification requirements." Pending the formulation of American policy, the A.R.B. delegation will simply attempt to persuade the C.A.A. that British requirements are adequate. It is reported that the discussions will be followed by a visit to this country by C.A.A. representatives, who will be able to make a complete personal investigation of the circumstances in which British transport aircraft are manufactured, certificated and operated.

The announcement recalls the prolonged negotiations which resulted in American acceptance in October, 1950, of British certificates of airworthiness for civil types other than those powered by gas turbines. The C.A.A. were at first unwilling to recognize the British requirements then prevailing, despite the fact that these were based on I.C.A.O. standards which in turn were based mainly on American requirements. So far the C.A.A. has only admitted willingness to consider each aircraft type on an *ad hoc* basis. Acceptance of British C.s of A. is, of course, essential to the export of the new British airliners to America. The sale of Comet 3s to P.A.W.A., for example, is conditional on C.A.A. acceptance of the British certificate. The influence of PanAm. who have already stated that there should be no difficulty in gaining this acceptance, should help to counter the "anti-Comet" views of those American manufacturers and operators who, for obvious reasons, would be sorry to see British jet airliners earning revenue in the States. There will be no obstacle to T.C.A. operation of Viscounts within the U.S.A., since Canada accepts British airworthiness requirements and the onus of enforcing airworthiness is, by international agreement, borne by the responsible authority in the country of origin.

INDIA'S AIRLINE CORPORATION

A BRIEF report from New Delhi gives April 1st as the probable date of the nationalization of the Indian airlines. The necessary legislation, it is stated, will be introduced in the forthcoming budget session of the Indian parliament. The probable name of the state airline, which will be responsible for both domestic and international air services, is Indian Airways Corporation.

CORPORATION'S JULY RESULTS

REVENUE passenger-miles flown on B.O.A.C. services in the 28 days ending July 26th, 1952, exceeded 78 million, compared with 72 million in the 31 days of July, 1951, giving an effective increase in the rate of output of some 20 per cent. The greatest increase was on the routes of the western area, on which over 34 million passenger-miles were flown, compared with 27 million in July, 1951—an effective increase of over 40 per cent. Freight and mail traffic also showed continuing expansion in this area, but were disappointing in the eastern area, reaching only 1,360,000 and 910,000 short ton-miles, respectively, for the 28 days, compared with 1,580,000 and 990,000 in July, 1951; the overall revenue load factor achieved on eastern services fell from 74 to 69 per cent.

The number of passengers carried on B.E.A. services was 23 per cent above the figure for July, 1951. Domestic passengers increased by 26 per cent. The number carried on B.E.A.'s international services was 19 per cent higher, even though total carryings to and from the Continent during summer were lower than in the previous year. The Corporation carried 1,829 short tons of freight and mail, an increase of 15 per cent over July, 1951. Services flown by associates of the two Corporations were more extensive and carried more traffic. The route mileage was doubled,

CIVIL AVIATION NEWS . . .

capacity increased by over a third, and the overall revenue load factor improved to 67 per cent. Passenger-miles flown were more than double last year's July figure.

SOUTH AFRICAN AIRPORTS

THE South African Cabinet has agreed in principle that the control and maintenance of the three biggest airports in the Union, now being constructed at an aggregate cost of between £11,000,000 and £12,000,000, be transferred from the South African Railway Administration to the Department of Transport. The Government itself will assume responsibility for the financing of the undertaking. The three are the Jan Smuts international airport at Kempton Park, which will replace Palmietfontein; the Durban national airport at Reunion, which will take the place of Stamford Hill Airfield; and the Cape Town national airport at Bellville, which will supersede the old Wingfield airfield. Construction on all three airports is stated to be well under way.

JAPAN'S CHOSEN INSTRUMENT

THE general manager of Japan Air Lines, Mr. Royhei Itow, said recently in New York that his company would be the only airline licensed by the Japanese Government to operate international services. Although this had not been officially announced, he is quoted as saying that the company had an understanding with the Government. Mr. Itow also said that J.A.L. would inaugurate a trans-Pacific service from Tokyo to San Francisco *via* Wake and Honolulu in April, although the necessary bilateral agreement has not yet been signed.

NEW LONDON TOWER

WORK begins this month on the superstructure of the new nine-storied air traffic control building in the central terminal area. The contract, which will be carried out under the Air Ministry Works Directorate for the M.C.A., has been awarded to Taylor Woodrow Construction, Ltd., the London contractors who have constructed the tunnel under No. 1 runway at London Airport to give access from the Bath Road to the central area. Taylor Woodrow are also constructing the foundations for this and two other permanent buildings, the consulting engineers for which are Sir William Halcrow and Partners. These are the first of a group of traffic-handling buildings designed by Mr. Frederick Gibberd, F.R.I.B.A., M.T.P.I., on behalf of M.C.A.

LUFTHANSA : THE FIRST STEP

THE formation of Aktiengesellschaft für Luftverkehrsbedarf—the preparatory company of Germany's post-war airline—was announced in Cologne on January 6th, the 27th anniversary of the founding of the original Lufthansa. The new company has an initial capital of 6m marks (£500,000), of which the Federal Government and Railways contributed 5½m marks, the remainder being provided by the Government of North Rhine-Westphalia. Dr. Seebohm, Federal Transport Minister, presided at the meeting. Dr. Kurt Weigelt, former Lufthansa president, was chosen as president of the new company, and the former commercial manager of the pre-war airline, Herr Hans Bongers, was appointed managing director.

DR. SEEBOHM, Federal German Minister of Transport.

The task of the company will be mainly that of buying aircraft and training crews in preparation for the day when Germany regains her sovereignty. Germans will not be allowed to fly aircraft until the Bonn Convention is ratified, probably next spring. Capital is to be raised to 150 m marks by the State and through medium-term loans; this will enable the purchase of aircraft engines and spare parts from Britain and America.

There has already been much speculation as to the type of aircraft which Germany will choose. Initial studies have found a requirement for 24 aircraft—12 four-engined machines, for the overseas routes, and 12 twin-engined, for European services. Although Federal Germany has a sterling balance, British turbine-powered aircraft are not immediately available; initial choice of Convair 240s and Constellations (interested American companies are said to have offered to supply used aircraft of this type) might prove a stepping-stone to Convair 340s and Super Constellations.

Another possible choice in the medium category, however, is the Viking—and B.E.A. have recently announced that a number of Vikings are for sale. Last year the prototype Viscount 700 made a successful demonstration tour of Germany, and a Comet visit is forthcoming. British interest in Germany's airline plans is also evinced by the report that Mr. Peter Masefield, chief executive of B.E.A., will shortly visit Western Germany to offer B.E.A.'s co-operation in the work of re-forming Lufthansa.

Strong American influence was apparent between the lines of a German newspaper's recent leading-article statement that "Lufthansa must be equipped with first-class and tested aircraft of the piston-driven type."

Most of the Lufthansa capital will probably be invested by the Federation and the nine West German states, but private investment will also be encouraged. Dr. Seebohm, urging that the re-establishment of a German airline is long overdue, has appealed for the utmost support. There will, however, be no encouragement for the formation of independent airlines: Germany already had to make up eight years' lost time against her competitors abroad, said Dr. Seebohm, adding that internal competition would be unwelcome.

As Germany has no airline and no sovereignty, foreign airlines are at liberty to exercise Sixth Freedom (cabotage) rights on German routes. It is estimated that 28 companies now earn a total of £12m annually in Germany for a total expenditure of £4m. German traffic rights will be retained after the ratification of the Bonn Convention by all the non-German airlines until bilateral agreements have been reached with the governments concerned.

American Aviation reports that Lufthansa's routes will be established in four stages: 1953-4, Europe and North Atlantic; 1954-5, South America; 1955-6, Near East; 1956-7, Far East.

SIR HARTLEY SHAWCROSS left Blackbushe on January 6th by Airwork Viking to visit Aden, where he is conducting the case of the Anglo-Iranian Oil Company against the Persian Government. Since its inauguration last June the jointly operated Hunting/Airwork "Safari" Service to East Africa has been filled to over 90 per cent of capacity; it is well booked up to six months ahead.

SABENA'S YEAR

SABENA, the Belgian airline, lists the following highlights among its activities in 1952, the 29th of the company's existence: the opening of new offices in Glasgow, Berlin and Detroit; inauguration of services to Luxembourg, Barcelona, Milan *via* Frankfurt, and between Costermanville and Dar-es-Salaam; opening of tourist services on the North Atlantic route and to Leopoldville; beginning of all-freight services to Leopoldville, Johannesburg and New York; acquisition of traffic rights at Tripoli. On August 15th, two of the company's DC-4s, lent to U.N.O. for two years by the Belgian Government, completed their service on the Pacific airlift from San Francisco to Japan; they made 194 return flights during that period. Sabena's growing interest in freighting was reflected during the year by the announcement of an order for two DC-6A cargo aircraft. Eight DC-6Bs are also on order, the first of which will soon be delivered.

SKYWAYS AND LANCASHIRE

IN a review of the two companies' combined activities during 1952, Skyways, Ltd., and Lancashire Aircraft Corporation, Ltd., report that strong demands for air transport during the summer and autumn diminished the effect of the aviation-spirit cut earlier in the year. The group's operations were formally divided during the year; Skyways, who now have a fleet of 29

Yorks, are responsible for all the four-engined aircraft, and Lancashire operate the twin- and single-engined aircraft. Some 40,000 troops were carried during the year by Skyways Yorks, while L.A.C. machines carried 15,000 passengers on internal services. Numerous charter flights (some on behalf of the two State Corporations) have also been operated by aircraft of both companies. The Skyways-Lancashire group started the New Year in new London offices at 7 Berkeley Street, W.1 (Tel.: GROsvenor 7721-5); London manager is Mrs. E. Whittaker.

AUSTRALIAN NEWS

RECENTLY issued statistics for the 12-month period ended June 30th, 1952, show that the Government-owned Trans-Australia Airlines have finally gained a lead over their privately owned competitor, Australian National Airways. Results achieved in that period by T.A.A. (with A.N.A. figures shown in parentheses) were as follows: passengers carried, 669,275 (656,730); revenue passenger-miles flown, 316,851,000 (272,019,300); miles flown, 16.5 million (15.1 million); hours flown, 95,681 (94,225). The private company carried more freight than its State rival (30,888 tons, compared with 14,494 tons), but achieved a lower passenger load-factor (64.1 per cent against T.A.A.'s 70.5 per cent). Formed in 1946, T.A.A. recently carried its 3,000,000th passenger.

T.A.A. have introduced an instalment plan for ticket-purchase, designed primarily to popularize holiday air travel. The prospective passenger pays a 15-per-cent deposit (minimum £A2) and pays the balance over a period of up to 12 months in instalments of not less than 10s. Large-scale employers are being asked to co-operate with the airline by deducting instalments from the wages of employees who decide to use the service, which is free.

AN INDEPENDENT REPORT

INDEPENDENT operators seldom issue a statistical report of their activities, and the following figures for 1952 recently published by Silver City Airways are, therefore, of particular interest. They were achieved with a fleet of nine Bristol Freighters, which took-off and landed over 9,000 times without mishap; operations consisted of scheduled car-ferry services between England and France, charter flights (mainly on cross-Channel routes) and high-intensity freight work on the "little Berlin airlift."

	Total	Air Ferry	Berlin Airlift and Charter
Miles flown	1,000,050	301,000	699,050
Passengers carried ...	28,500	27,000	1,500
Cars carried	7,000	6,970	30
Motor cycles carried ...	2,200	2,200	—
Cycles carried	1,850	1,850	—
Freight, tons carried (including vehicles) ...	21,000	12,250	8,750
Total fleet flying-time (hr)	7,000	—	—
Equivalent annual utilization per aircraft (hr) ...	825	—	—

Vehicle traffic on the ferry services was ten per cent less than in 1951, due largely to the decreased overseas spending allowance, but the fact that surface-ferry traffic dropped by 30 per cent over the same period was some consolation to S.C.A. Increased charter work kept the Freighters well occupied. The company observes that although utilization appears to be low, this is a natural function of short-range high-density work, with its penalties in ground-handling time.

A.S.T. AIGLETS: Standing by this Auster Aiglet Trainer are Mr. Whitehead (left) and Mr. Ranei, both instructors employed by Air Service Training, Ltd., at Hamble. They took delivery of two such aircraft, the first to be operated by the company; each machine is fitted with the standard rear seat with intercom point, which permits a second pupil to listen-in on the proceedings. Full blind-flying panel and 6-channel Plessey radio also fitted.

RÖKNING FÖRBJUDEN as passengers board a Scandinavian Airlines System Saab Scandia at Torslanda Airport, Gothenburg. The Scandia shown is a Swedish-built aircraft bearing a Norwegian registration and working the route linking Copenhagen with Oslo via Gothenburg.

BREVITIES

AUSTRALIA'S director general of civil aviation, Air Marshal R. Williams, has announced that the Australian domestic airlines carried almost two million passengers in 1952 without a fatal accident; this figure represents nearly one in four of the population.

* * *

South African Airways have decided to follow the now customary airline practice of painting the tops of their aircraft cabins white in order to reduce interior temperature.

* * *

A fine of £5 was imposed on each of four crew members of a William Dempster, Ltd., Tudor for attempting to evade Customs duty. The prosecution stated that while inspecting the aircraft at Bovingdon after a flight from Johannesburg, a Customs officer discovered bottles of spirits, tobacco and matches.

* * *

Statistics compiled by the Air Transport Association of America show that 260 airliners (115 four-engined, 145 twin-engined) will be delivered to American companies by the end of 1954. The type in greatest demand is the Convair 340, of which 111 have been ordered by U.S. airlines.

* * *

No fewer than 240,000 people passed through Shannon airport in 1952; this figure represents an increase of 50 per cent on the 1951 total. The duty-free liquor store at Shannon, which makes a considerable contribution towards the airport costs, is said to have earned nearly £180,000 last year.

* * *

New Zealand National Airways Corporation operated its first scheduled Heron service between Paraparaumu and Blenheim and Nelson on December 15th. The aircraft is the first of three which will eventually be used on the Cook Strait service. Paraparaumu will be replaced as the Wellington base by Rongotai when runway strengthening work at the latter airport has been completed.

* * *

An Oslo newspaper has reported that S.A.S. plan to operate two flights next May from Oslo to Tokyo *via* Thule and Fairbanks. As on the recent pioneering flights from Los Angeles to Scandinavia *via* the Northern route, the aircraft used will be DC-6Bs. Although obviously intended to prove the possibilities of projected passenger services to Tokyo, both operations will take the form of charter flights carrying personnel to the Norwegian field hospital in Korea.

* * *

Air-transport movements at U.K. airports last November totalled 11,550, four per cent more than in November, 1951. There were increases of 20 per cent and nine per cent in the totals for passengers handled and freight on-and-off-loaded (respectively 169,100, and 346,000 short tons). The number of movements at London Airport (2,570) was two per cent more than in November 1951 and there was an eight per cent increase in the number of passengers handled; at Northolt there were 13 per cent more passengers despite a one per cent decrease in movements. Percentage increases in passenger traffic at Prestwick, Renfrew and Manchester were, respectively, 26, 49 and 62.

THE REDUNDANT INSTRUCTORS

Air Ministry will "Consider Sympathetically" Applications to Re-join R.A.F.

AN official statement issued last Monday, referring to the recent decision to close several civilian schools engaged in service flying-training and testing, said that "The Air Ministry have felt bound . . . to reject a claim advanced by the British Air Line Pilots Association and other representative organizations for financial compensation; but they will consider promptly and sympathetically all applications received for re-entry into the R.A.F. either for flying or for ground duties, either in commissioned or in non-commissioned rank. . . . Wherever an applicant is accepted as suitable the vacancy will be reserved for him until he has completed his work with his civil employers.

A number of instructors have, it is stated, already enquired about the possibility of re-entry into the R.A.F. Arrangements are being made for early examinations of Service records and interviews for all applicants, not only for aircrew but from all classes of personnel employed by the civil schools. Full details of the required qualifications and conditions of service may be obtained from the Air Ministry (S.14), Adastral House, Kingsway, London, W.C.2.

Although the Air Ministry announcement means that hardship will in many cases be alleviated, there is no doubt that hardship remains—particularly among the more experienced instructors whose age will disqualify them from re-entry to the R.A.F. Many instructors would, of course, have rejoined the R.A.F. long before the schools were to be closed, had they been in a position to do so.

Some pertinent comments on the subject were contained in a statement issued by the Guild of Air Pilots and Air Navigators on January 9th, which stated that the announcement of the cuts came "as a considerable shock to all concerned with civil flying training in this country and has caused a great deal of anxiety to our members." The statement continued:—

"Some 300 pilot and navigational instructors are affected, many of whom will be thrown out of work almost immediately. Although some of them may be able to transfer to other branches of the flying profession, such as the airlines and charter companies, the big majority, together with their accumulated experience—surely a valuable asset to the nation . . . will be lost to aviation for ever.

"These men have been employed by a number of private firms who had engaged them in all good faith on a semi-permanent basis. To learn just before Christmas, as they did, that their services would no longer be required—through no fault of their own, despite their skill and experience and loyalty—seems very cruel. We think that some form of rehabilitation—such as was available to ex-R.A.F. personnel at the end of the war—whereby they can be trained for some other work is the least that should be done for them. But whatever help is forthcoming should come quickly. . . .

"The Court of the Guild has already allotted a sum of £2,500 to help those wishing to transfer to other branches of the flying profession to obtain the necessary qualifications.

"We do not question the wisdom nor do we in any way challenge the right of the Air Council in their discretion to decide what is the most effective way of training Royal Air Force pilots of the future. We are, perhaps better fitted than any other body to appreciate the great developments in aviation that are taking place and of the inevitable change in operational technique which results, and it is very clear to us that the crews of, for instance, future bombers (of which we already have a foretaste in the Valiant, the Vulcan and now the Victor), will need to be the finest that the country can produce. The cost of the aircraft itself, the fabulous value of the loads it is destined to carry, and the importance of each individual sortie, will place a big responsibility on the pilot and his crew.

"In consequence of these developments it may well be that the value of the Reserves as we knew them in the last war, when thousand-bomber raids were the order of the day, must, through inevitable lack of enough practice and training, be reduced.

"None the less, we are seriously perturbed by the effect the closing down of the civilian schools will have on the future development of aviation in this country. How the ever-growing demand for pilots and navigators of the quality required to operate our future airliners is to be met is causing us grave concern. The British airliner is keeping pace with its military counterpart and some types are now classified, along with the latest fighters and bombers, as of super-priority.

"We fully appreciate that the high expense of training civil pilots, though they will still form a valuable reserve for the Royal Air Force, should not fall exclusively on Air Ministry funds—as, in effect, is the position today by reason of the transfer of young R.A.F.-trained crew to civil organizations. At present there is no alternative way of getting training and gaining the necessary experience. The Court of the Guild will shortly put forward some constructive proposals in this connection, for it seems to us as important to have the right crews as the right aircraft. The fact that more people visited these islands last year by air than by sea emphasizes the importance of this air business. The great and increasing value of the aircraft export trade is already well known.

"We wonder if the Air Council have taken full cognisance of the effect of their action from this point of view and of the lack of confidence in air circles that has been created by the dismissal at short notice of so many of the staff of instructors and navigators and others, at a time when the country is seeking to get the very best of its youth to take to active flying . . ."

ANOTHER RESTRICTION ON TRAVEL

FUEL companies have been instructed by the Bank of England that they must not accept payment in sterling for supplies of aviation fuel or lubricants lifted outside the sterling area by British-owned aircraft without prior permission of the Exchange Control. Airline and charter companies are not affected by the restriction, which (as might be expected in these days) adversely affects the use of aircraft for private recreational or pleasure purposes. The result is that private owners will be limited to the expenditure of £15 on fuel and oil—a completely inadequate sum. The arbitrary selection of this amount can, as pointed out in this week's leading article, be criticized on several counts.

To begin with, there are only 387 business and private aircraft on the current civil register. Since only a minority of their owners use these machines for touring abroad, the amount likely to be saved will be almost insignificant—less than £10,000 annually, according to a Royal Aero Club estimate. There would, of course, be nothing to prevent a private owner from chartering a flight abroad if his personal allowance were insufficient. The value of the £15 is reduced by certain expenses not met by car owners—transport to and from Continental airfields, hangarage, maintenance, landing fees and the proportionately higher costs of fuel. It is understood that motorists who take part in sporting and competitive events abroad receive an additional allowance, but no such concession has been mentioned for aircraft owners—despite the obvious value of British participation in overseas flying meetings, both from the prestige and export sales viewpoints. The worst result of the order is possibly the lowering of safety standards which might result from the natural desire of the private owner to keep his foreign fuel-uplift to a minimum, despite lack of radio aids and consequent need of good reserves.

H.P. ON T.V.

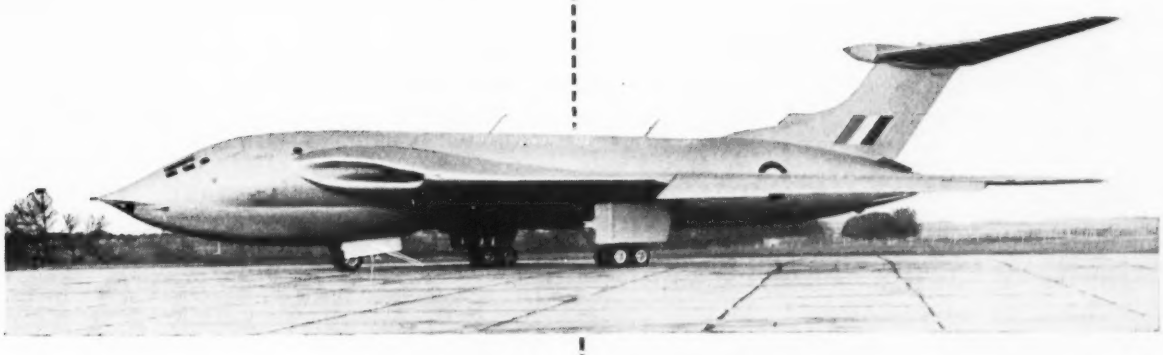
THE Handley Page Victor and the effect of super-priority were featured in a recent edition of the B.B.C.'s *Television Newsreel*. Mr. R. S. Stafford, F.R.Ae.S., chief designer at Cricklewood, was interviewed by Mr. Charles Gardner, B.B.C. Air Correspondent. Asked about the crescent-wing on the H.P.80, Mr. Stafford explained that the relative advantages of straight-swept, razor-thin, delta and crescent wings had been examined and the latter finally adopted as the best answer for the bomber as it had to "fly very high, carry big loads a long way at very high speeds." Mr. Stafford continued: "We feel that in the crescent wing we have a form in which we meet the high speed requirements and at the same time we have very good control properties at low speeds."

S/L. Hazleden, test pilot on the maiden flight, then said that on that occasion his main concern were the safe take-off and safe-landing properties and that as far as these were concerned the aircraft "behaved very well indeed."

Sir Frederick Handley-Page, referring to the Victor's super-priority classification, explained that as it was a simple aircraft to construct it would not require any great amount of skilled labour; but that where super-priority would help would be in the supply of materials. Super-priority would definitely enable the R.A.F. "to get deliveries at an earlier date than would otherwise be the case."

The granting of super-priority to three civil aircraft, the Comet, Viscount and Britannia, orders for which already total over £150,000,000, was then discussed in an interview with Mr. Verdon Smith of Bristols. In general terms, he said, it meant that the Government was placing the civil aircraft programme on the same level of importance as the defence programme.

WORLD'S FIRST OPERATIONAL CRESCENT BOMBER



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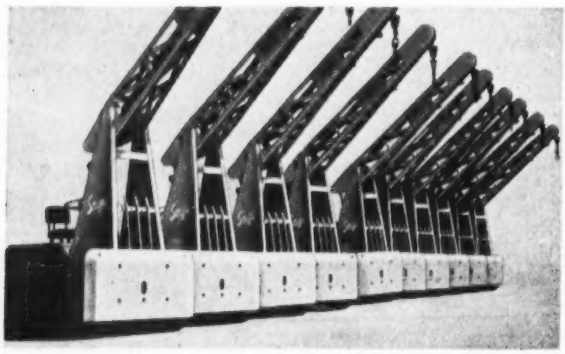

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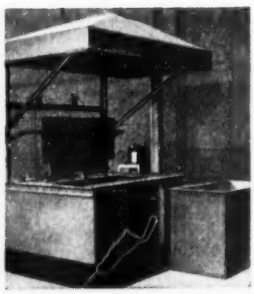

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SERVICE AVIATION

Royal Air Force and Naval Aviation News

SABRETACHE: One of the two Bristol 170s used by the R.C.A.F. in Britain for the carrying of Sabre spares between No. 30 Air Materiel Base at Langar, Notts, North Luffenham (Rutland) and Gros Tenquin in France. They operate as part of No. 127 Flight, R.C.A.F., commanded by S/L. F. Jolicoeur.

No. 63 Group A.O.C.

UNTIL recently Director of Flying Training at the Air Ministry, A. Cdre. W. S. Hebden has been appointed A.O.C. No. 63 Group, Home Command.

A. Cdre. Hebden served with the Advanced Air Striking Force in France at the beginning of the war and later commanded No. 109 Squadron. After a period in the United States on signals liaison duties he was made Chief Signals Officer of the then newly-formed Transport Command and in 1945 commanded a transport wing in the Mediterranean.

"Ocean" in Greek Exercises

THE aircraft carrier H.M.S. *Ocean*, which arrived recently in Suda Bay, Crete, is taking part in combined exercises with units of the Greek Navy, Army and Air Force.

Having served in Korean waters, *Ocean* is expected to create during the exercises some of the conditions experienced in the Far East.

The Greek Air Force has recently received a number of Thunderjets. These were delivered by air from America *via* Greenland, Iceland, Scotland, Germany and Italy. Their actual flying time was approximately nine hours.

New Cyprus Air Base

A LARGE new airfield is to be built for the Royal Air Force at Episkopi Bay, to the west of Limassol in southern Cyprus. The main runway is expected to be 3,000 yards long, and the new base will therefore be suitable for bombers and transports. Local sources report that a nearby area has been earmarked for Army camps for British Middle East troops. Nicosia will continue to be used as a fighter base.

Malta Blitz Reconstructed

ALL three Services have co-operated in the production of *The Malta Story*, a film depicting the siege of Malta.

For the flying scenes four Spitfires from No. 41 Group, Maintenance Command, flown by pilots of Fighter Command, and two Wellingtons from No. 2 Air Navigation School, Thorney Island, flown by crews from Flying Training Command, were attached to R.A.F. Station Luqa. Both here and at Ta Kali, a R.N.A.S. airfield now jointly used by the Royal Navy and the Royal Air Force, scenes reminiscent of 1941-42 were enacted as the Spitfires scrambled.

The Spitfires also simulated the first delivery of these fighters to Malta during the critical days of 1942. Combat formations were filmed from the rear turrets of the Wellington. At Safi airfield a strip of disused runway was employed to simulate repair of runways after enemy bombing.

F/L. J. B. Staples, D.F.M.—who won his decoration as a pilot in Malta at the time of the siege—acted as liaison officer, and F/Sgt. Aquilina who actually drove A.V-M. Hugh P. Lloyd—who then held that rank, A.O.C. Malta—performed the same rôle in the film.

Naval Appointments

IN the appointments of Flag Officer Second-in-Command Mediterranean Fleet and Flag Officer Air (Mediterranean), Rear-Admiral W. W. Davis, C.B., D.S.O., R.N., has relieved Vice-Admiral R. A. B. Edwards, C.B., C.B.E.

Capt. T. G. C. Jameson has become Director of Air Operational Training, Admiralty, and Capt. E. P. Hinton, D.S.O., M.V.O., is in command of H.M.S. *Indefatigable*. Capt. J. A. Ievers, O.B.E., is the new commanding officer of Royal Naval Air Station Lossiemouth.

New Australian Naval Squadron

A THIRD fighter squadron is being formed this month for the Royal Australian Navy. Designated No. 850 (Fighter) Squadron, the new unit will be based at Nowra, New South Wales.

Like the other two Australian naval fighter squadrons, No. 850 is being equipped with Hawker Sea Furies, but eventually all three will have de Havilland Sea Venoms.

The formation and training of this new unit probably coincides with the commissioning of the aircraft carrier *Vengeance*, which left Plymouth for Australia on January 7th. The *Vengeance* is being lent to the R.A.N. for four years until another carrier, now building in Britain, is completed.

R.A.F. Half-Yearly Promotions

THE following half-yearly promotions have been announced by the Air Ministry :—

GENERAL DUTIES BRANCH. *Air Commodore to Air Vice-Marshal.*—S. O. Bufton, C.B., D.F.C., H. H. Brookes, C.B.E., D.F.C., L. W. Cannon, C.B., C.B.E., W. H. Merton, O.B.E., H. P. Fraser, C.B.E., A.F.C., J. H. Edwardes-Jones, C.B.E., D.F.C., A.F.C., A.D.C.

Group Captain to Air Commodore.—D. L. Thomson, D.S.O., D.F.C., E. L. S. Ward, D.F.C., H. M. Pearson, C.B.E., G. Bearne, C. D. C. Boyce, C.B., C.B.E., R. C. Mead, C.B.E., D.F.C., A.F.C., A.D.C., R. B. Lees, C.B., C.B.E., D.F.C., A.D.C., A. M. Rodgers, E. C. Bates, C.B.E., A.F.C., D. G. Morris, C.B.E., D.S.O., D.F.C., A.D.C., K. B. B. Cross, C.B.E., D.S.O., D.F.C.

Wing Commander to Group Captain.—S. G. Birch, O.B.E., J. H. Giles, D.S.O., D.F.C., J. L. Barker, C.B.E., D.F.C., G. K. Buckingham, O.B.E., D.F.C., J. H. D. Chapple, A. V. Rogers, A.F.C., J. F. Newman, D.S.O., D.F.C., T. W. Piper, O.B.E., A.F.C., M. Wyatt, D.F.C., E. G. Watkins, A.F.C., S. L. Ring, D.F.C., F. C. Griffiths, D.F.C., A.F.C., P. W. D. Heal, A.F.C., R. D. Williams, D.F.C., A. C. Stewart, D.F.C., R. K. Cassels, D.F.C., A.F.C., J. H. Searby, D.S.O., D.F.C., D. H. Lee, D.F.C., J. L. Crosbie, O.B.E., G. A. Richmond, M.B.E., H. E. C. Boxer, O.B.E., P. W. Townsend, C.V.O., D.S.O., D.F.C., P. T. Philpott, O.B.E., T. B. de la P. Beresford, D.S.O., D.F.C., G. D. Garvin, J. B. Tait, D.S.O., D.F.C., F. E. Rosier, D.S.O., O.B.E., S. W. B. Menaul, D.F.C., A.F.C.

Squadron Leader to Wing Commander.—E. C. S. Fewtrell, D.F.C. (*sen. Jan. 1st*, 1952), J. O. Barnard, J. B. J. Boardman, D. W. Edmonds, D.F.C., A.F.C., J. I. Kilmartin, O.B.E., D.F.C., P. R. W. Wickham, D.S.O., D.F.C., P. W. Cook, A. M. G. Lywood, D.F.C., W. A. Smith, D.F.C., B. Drake, D.S.O., D.F.C., A. J. Douch, E. R. Bell, M.V.O., D.F.C., A.F.C., G. W. Garton, D.S.O., D.F.C., A. P. Dart, D.S.O., D.F.C., L. H. Bartlett, D.S.O., H. G. F. Larsen, D.F.C., A. L. Winskill, D.F.C., C. F. Bradley, D.S.O., G. McKenzie, D.F.C., A. K. Furse, D.F.C., R. A. G. Ellen, M.B.E., C. W. S. Thomas, A.F.C., W. Surtees, D.F.C., R. B. Fleming, D.F.C., A.F.C., G. Frain, M.B.E., J. Brain, A.F.C., D. F. Rixson, O.B.E., D.F.C., B. G. F. Drinkwater, N. H. Elliot, E. Q. Moody, E. Garrad-Cole, M.C., G. F. Morley-Mower, D.F.C., A.F.C., M. C. Adderley, A.F.C., B. Lewin, D.F.C., R. W. Oxpring, D.F.C., A.F.C., H. W. Harrison, L. T. Bryant-Fenn, D.F.C., B. C. Bennett, A.F.C., F. B. Sutton, D.F.C., C. A. Alldis, D.F.C., F. D. Hughes, D.S.O., D.F.C., A. A. N. Nicholson, H. A. C. Bird-Wilson, D.S.O., D.F.C., A.F.C., C. L. W. Stewart, D.S.O., A.F.C., C. C. M. Baker, O.B.E., D. B. Fitzpatrick, A.F.C., R. N. H. Courtney, D.F.C., D. E. Hawkins, D.F.C., K. J. Sewell, A.F.C., D.F.M., W. G. G. D. Smith, D.S.O., D.F.C.

Flight Lieutenant to Squadron Leader.—J. A. A. Gibson, D.S.O., D.F.C., A. E. Bull, T. L. Higgins, H. Shannon, D.F.C., H. J. McRae, A. J. Ogilvie, D.S.O., D.F.C., A.F.C., P. P. Villa, P. D. W. Chappell, W. J. Hunter, T. N. Staples, D. N. Shepherd, D.F.C., J. P. Trant, R. H. Steel, O.B.E., J. A. Atkinson, R. S. Kerby, P. A. Knapton, D.F.C., H. K. Rees, S. R. Dixon, O. L. Hardy, D.F.C., R. F. H. Martin, J. G. Mejor, D.F.C., D. K. Allport, D.S.O., D.F.C., B. S. Martin, D. R. Howard, D.F.C., G. E. Booth, J. Garden,

SERVICE AVIATION . . .

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(To be continued)

R.A.F. S.A.A. President

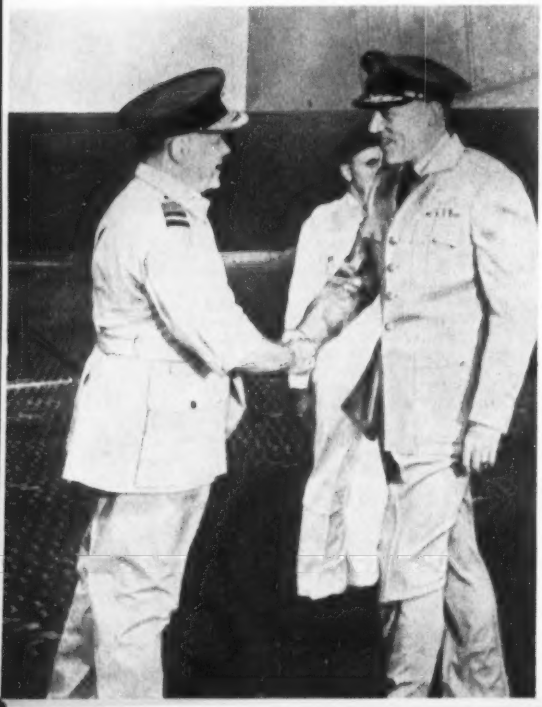
TAKING the place of Air Chief Marshal the Hon. Sir Ralph Cochrane, who has retired, Air Marshal Sir Ronald Ivelaw-Chapman, Deputy Chief of the Air Staff, has consented to become the new president of the R.A.F. Small Arms Association.

R.N.A.S. Eglinton

AT present serving on the Joint Maritime Air Committee at the Admiralty, Capt. A. F. Black, D.S.C., R.N., is to take over command of R.N. Air Station, Eglinton, Northern Ireland, next July. Eglinton houses H.M.S. *Gannet*, the anti-submarine training establishment.

Capt. Black is a South African. He commanded No. 805 Squadron R.N. in 1940-41 in the Crete campaign, in the Western Desert and from H.M.S. *Illustrious*. For his work with this fighter squadron he was awarded the D.S.C. Later he commanded Nos. 803 and 806 Squadrons R.N. and subsequently was appointed Commander (Air) in H.M.S. *Victorious*.

Since the war Capt. Black has held flying appointments in both H.M.S. *Venerable* and *Implacable* and served as Commander (Air) in H.M.S. *Theseus* and *Ocean* in Korean waters.



WELCOME VISITOR: Air Marshal Sir Alfred C. Sanderson, A.O.C-in-C. Far East Air Force, greeting Brig. General J. W. Sessums, who commands 13th U.S.A.F., on his arrival at Changi, Singapore, from Clark Field, Philippines, with a training flight of Superfortresses.

"VENGEANCE" SAILS: The Australian High Commissioner, Sir Thomas White, travelled to Plymouth to say goodbye to the steaming party which is taking the aircraft carrier "Vengeance" to Australia.

Director of Flying Training

SUCCEEDING A. Cdre. W. S. Hebden as Director of Flying Training is A. Cdre. R. C. Mead, C.B.E., D.F.C., A.F.C., A.D.C., who, until recently, commanded the first Canberra operational conversion unit at Bassingbourn in Cambridgeshire.

A. Cdre. Mead is a graduate of the R.A.F. Staff College and was for a while S.A.S.O. at No. 23 Group, Flying Training Command.

Medals Galore

THE *R.A.A.F. News* draws attention to the large number of Australian Air Force personnel who have failed to claim their 1939-45 war medals. The report says: "The Air Force has six tons of stars and medals in store in Melbourne, and another three tons in Sydney—all waiting for claimants."

Anyone entitled to these awards should write, giving details for identification, to the Air Medal Section, Victoria Barracks, Melbourne, Australia.

Carriers in the Spring Cruise

FOR this year's Spring Cruise the Home Fleet will have no fewer than five aircraft carriers. Three of them, H.M.S. *Eagle*, wearing the flag of Rear-Admiral J. A. Hughes Hallett, C.B., D.S.O., Flag Officer Heavy Squadron, H. M. S. *Indomitable* and H.M.S. *Theseus*, will sail from Britain later this month. They will be joined in February by H.M.S. *Implacable*, wearing the flag of Rear-Admiral J. F. Stevens, C.B., C.B.E., Flag Officer Training Squadron, and H.M.S. *Indefatigable*, when the Training Squadron undertakes a brief cruise to Gibraltar and the western Mediterranean. The Home Fleet will be based on Gibraltar until mid-March.

After staying for a short while at Gibraltar, *Eagle* and *Indomitable* will sail for Malta for day- and night-flying exercises, while other units of the Fleet will operate in the Gibraltar area. The cruise programme is also expected to include some small-scale NATO exercises and visits to other foreign ports.

For the first time British naval helicopters will take part in a major Fleet exercise. A number of Westland Sikorsky Dragonflies are to be embarked in the carriers from Gosport and the pilots of these helicopters have all been trained in air/sea rescue.

Operations in Malaya

THE report covering December last shows that during that month over 250 sorties were made in support of ground forces operating in the jungle. R.A.F. Sunderlands, Brigands, Hornets and Vampires, and Australian Lincolns, all took part.

One operation by the Hornets continued for five whole days—including Christmas Day—during which continuous cover was provided for a party of 340 villagers, travelling on 93 rafts, on the river Lebir. The villagers were moving all their possessions to a less isolated site.

The month's work also included the dropping by Valettas of 250,000 lb of supplies on 143 dropping zones for ground security forces and police posts.

Reunions

NO. 780 Squadron R.N. is holding its seventh annual dinner at Simpsons in the Strand, London, on Friday, March 6th. Particulars from F. R. Steggall, 21, Markham Square, London, S.W.3.

The third reunion for all ranks who served with the R.A.F. in Aden and outstations during the period 1939-45, will be held at the Eccleston Hotel, London S.W.1, on Saturday, February 21st. Details can be obtained from Mr. W. Brackenbury, 9a The Bungalow, Rowan Road, London S.W.16.

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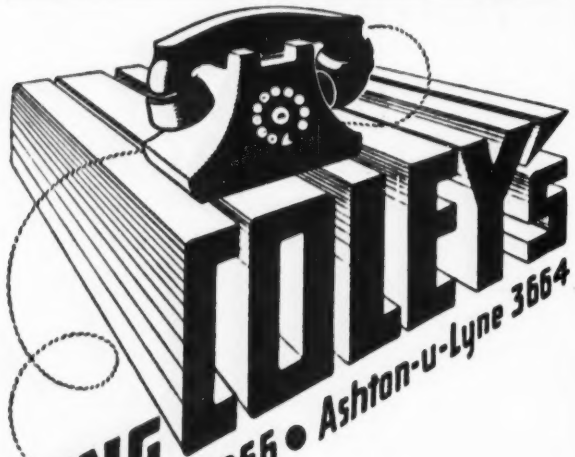

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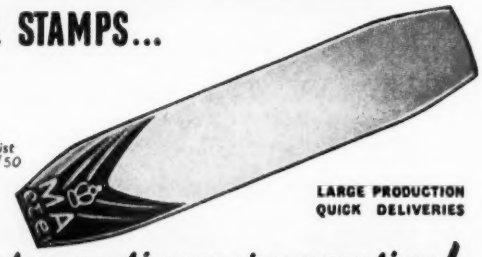

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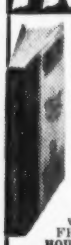

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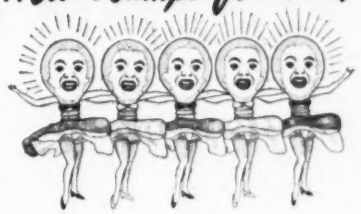

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INTENDING candidates should apply in writing to the Director of Recruitment (Colonial Service), Colonial Office, Sanctuary Buildings, Great Smith Street, S.W.1, giving brief details of their age, qualifications and experience. They should mention this paper and quote the reference number shown against the post for which application is made. [9129

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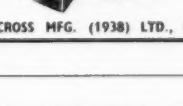

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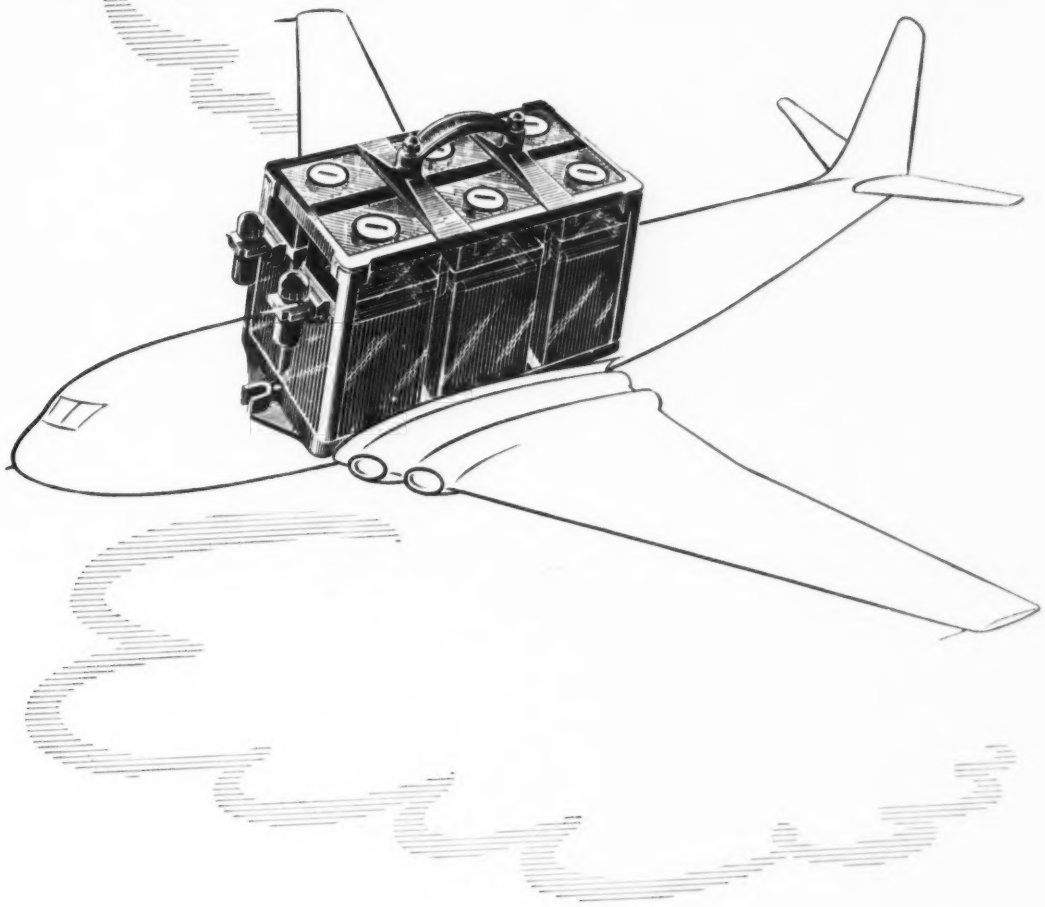

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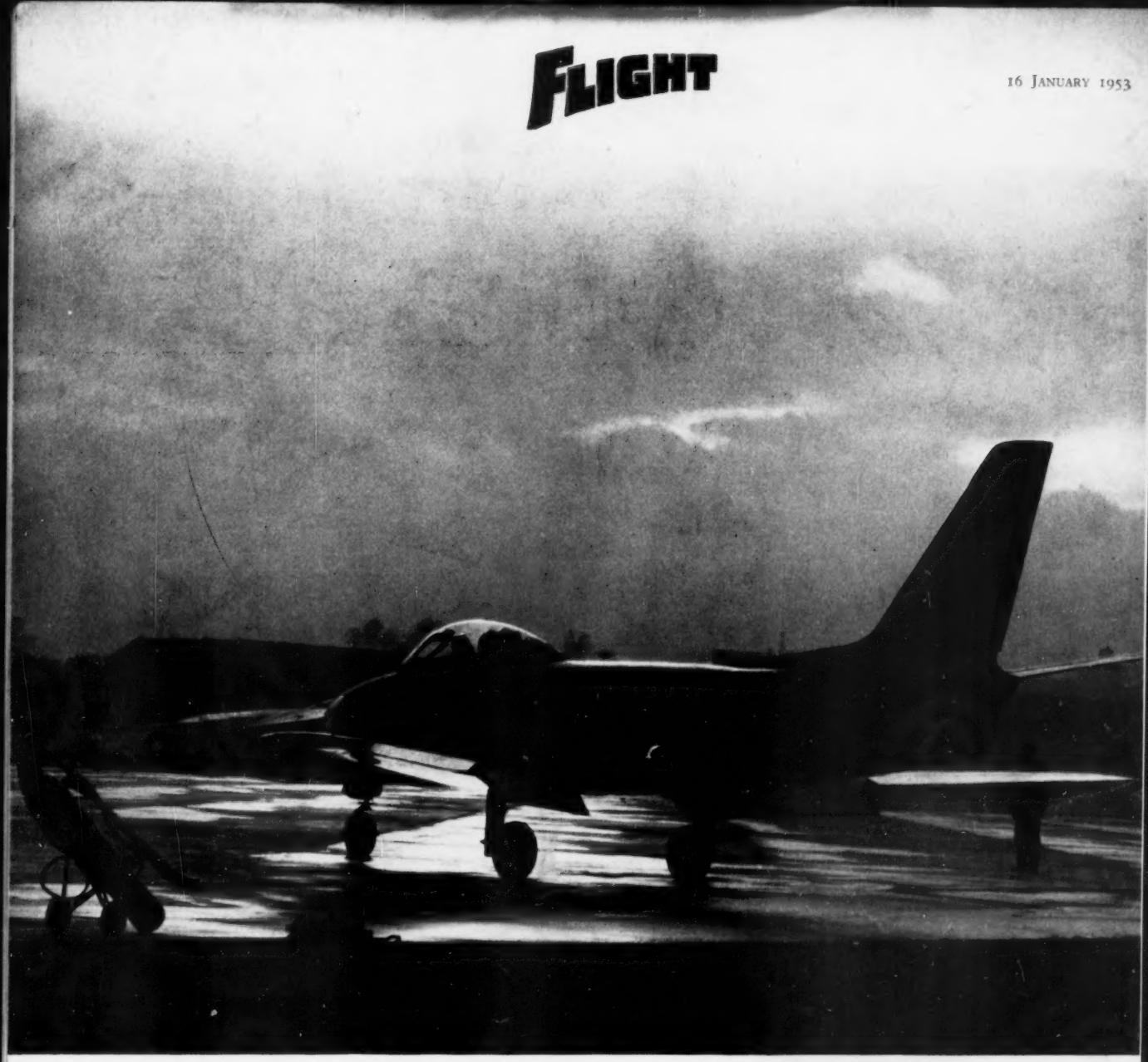

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